

# COAL MINING

August, 1961

UNIVERSITY MICROFILMS  
313 N 1ST ST  
ANN ARBOR, MICH

Volume 38, No. 8

rugged equipment for tough jobs...



*Highway*



Lima 2400 strips overburden for Harold A. Siegel Coal Co., Fryburg.

## HIGHWAY EQUIPMENT COMPANY

6465 Hamilton Ave. • Pittsburgh 6, Pa.  
40 Hoover Ave. • Du Bois, Pa.  
5245 Peach St. • Erie, Pa.

# BECKWITH'S

# 54 YEARS

## EXPERIENCE

## TAKES THE RISK OUT OF BUYING

## USED EQUIPMENT

"It's our business to know what a piece of used earthmoving or construction equipment is worth . . . whether it is a Caterpillar machine or a competitive make . . . whether it is almost new, almost worn out, has been repaired or completely overhauled.

"It's our business to know how much skilled repair time and genuine parts can be put into a used machine to balance the cost against remaining future work-life.

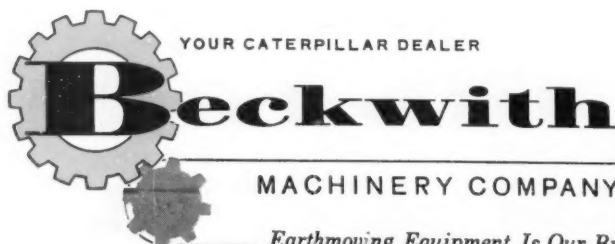
"It's our business to know what other dealers are doing with their used machinery as far as repairing and pricing similar makes, models, and machine conditions. And it is our business to stay competitive!

"More than this . . . we know we must offer you the best machines for the price, must give you the best warranties in the business to maintain our reputation as a fair-dealer since 1907. We help you take the gamble out of a used machine purchase. What's more, we have six Caterpillar authorized service-centers to back you with prompt delivery of genuine parts and maintenance.

"Call on our experience and facilities to get the 'best buy in used equipment.' "



W. W. COLDREN  
USED EQUIPMENT MGR.



YOUR CATERPILLAR DEALER

Caterpillar, Cat and Tractor are Registered Trademarks of Caterpillar Tractor Co.

6550 HAMILTON AVENUE, PITTSBURGH 6, PENNSYLVANIA  
361-369 CONGRESS STREET, BRADFORD, PENNSYLVANIA  
OLD TOWN ROAD, CLEARFIELD, PENNSYLVANIA  
1356 EAST 12TH STREET, ERIE, PENNSYLVANIA  
ROUTE 219 NORTH, SOMERSET, PENNSYLVANIA  
BUCKHANNON PIKE, CLARKSBURG, WEST VIRGINIA

# COAL MINING

Vol. XXXVIII August, 1961 No. 8

## Contents

Here and There in the Coal Industry	6
Do You Know? .....	6
Stop These Thieves . . . They're Stealing Your Efficiency .....	8
Use of Tractors For Stripping Is Increasing .....	11
High Sinking Rates at Kellingley ..	12
Ten Yard Electric Dragline Used by Aughenbaugh Coal Company ..	21
New Ripper Tips and Shanks are Stronger, Longer Wearing .....	27
Advertisers' Index .....	31

Published by

### Modern Mining Publishing Company

4575 Country Club Drive

Pittsburgh, Pa. Phone TU. 1-9411

P F. JASIK, Publisher and Editor



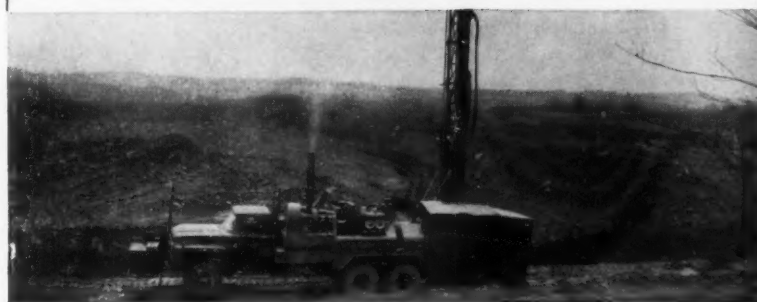
Printed by

ADVANCE PRINTING &  
LITHO CO.

1118-20 Chestnut St.

Erie, Pa.

GL 4-7196




Like other leading mine operators, Harmon Creek Coal Corporation, Burgettstown, Pa., speeds drilling and cuts costs with Davey Rotary Drills.

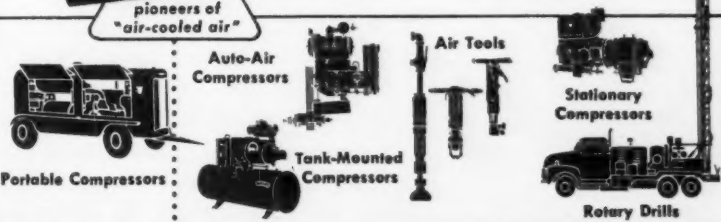
Daveys can be mounted on any make of truck . . . move fast between blast holes . . . are easy to set in position . . . ideal for low cost drilling. Offered in 8 truck-mounted models with capacities to 3,500 ft. Tractor-mounted drills also available.

A-238A

Write for Bulletin E-702S!




**DAVEY COMPRESSOR CO.**  
Kent, Ohio



Portable Compressors   Auto-Air Compressors   Tank-Mounted Compressors   Air Tools   Stationary Compressors   Rotary Drills

Published monthly by Modern Mining Publishing Company. Publication Office—Advance Printing & Litho Co., Erie, Pa. Editorial and Executive Offices—Erie, Pa. Pittsburgh Offices—P. F. JASIK, Publisher, 4575 Country Club Drive, Pittsburgh 36, Pa. Price: In the United States, \$3.00 year; all other countries \$5.00. Single copy 25 cents. Entered as second class matter at the Post Office at Erie, Penna., under the act of March 3, 1879.



**everything you  
need is in stock**

Over a million and a half dollars worth of parts! Parts by the thousands—the largest inventory in the area—that's Beckwith Machinery Company! In addition to the stock carried at Pittsburgh, Pa. (some of which is pictured on these pages), well-balanced supplies are also carried at our other five parts service-centers. Be 100% sure of top equipment performance and profits with 100% Cat parts from Beckwith.

**repair now and  
pay as you earn**

If your Caterpillar equipment needs repairs or parts, you can have the repair work done now by our skilled servicemen—or complete the repairs in your own shop, using genuine Caterpillar parts. Then put the productive Caterpillar machinery back to work. Each month make a low payment on the balance, as agreed with our Credit Manager, Tom Tyson. With our "Pay As You Earn" Plan, the equipment pays for its own repairs or needed parts. Check with us today for additional information.



## ***Your Best Insurance Against Lost Time — BECKWITH PARTS SERVICE!***

***YOUR MACHINES ARE BACK IN THE  
RUNNING SOONER WHEN THEY'RE BACK-  
ED BY BECKWITH PARTS SERVICE!***

This efficient division of the Beckwith Machinery Company insures against excessive lost time by keeping stocks of genuine factory-built parts on hand. Most parts are readily available... others will be obtained when you need them from factory depots or other Caterpillar Dealers.

This means you can operate without a big investment in a big parts stock of your own... you can be sure of getting the parts you need, for there are no orphans in the Cat line... you can get parts that will give the same long-lived service as the original.

Next time you have parts to replace, call on Beckwith Parts Service at the branch near you. We'll prove we have about the best in the business — try it!



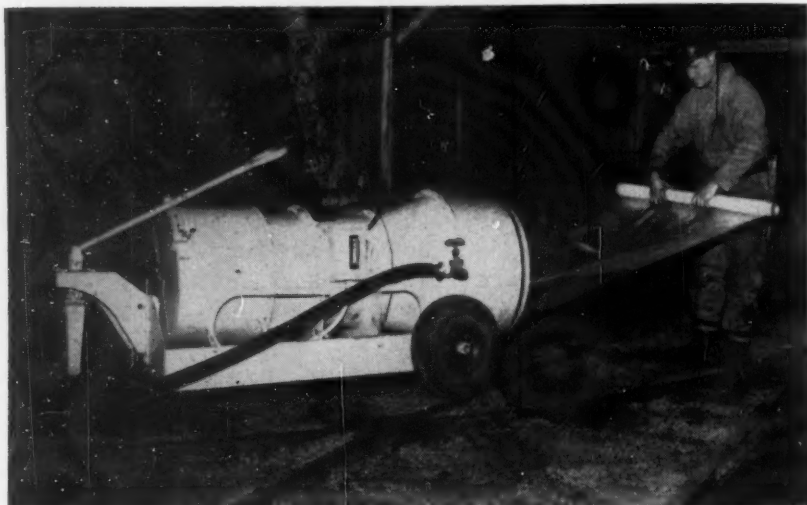
Caterpillar, Cat and Tractacolor are Registered Trademarks of Caterpillar Tractor Co.



YOUR CATERPILLAR DEALER

**Beckwith**  
MACHINERY COMPANY

ROUTE 22, EAST OF PITTSBURGH, PA.  
P.O. BOX 8718, PITTSBURGH, PA.  
361-369 CONGRESS STREET, BRADFORD, PA.  
OLD TOWN ROAD, CLEARFIELD, PA.  
1356 EAST 12TH STREET, ERIE, PA.  
ROUTE 219 NORTH, SOMERSET, PA.  
BUCKHANNOH PIKE, CLARKSBURG, WEST VA.



### NEW PORTABLE UNDERGROUND FIRE FIGHTER

A portable "fire-fighter" capable of delivering a quenching wave of foam one minute after the equipment has reached the scene may prove the answer to extinguishing stubborn underground mine fires.

George L. Alston, product line manager, of Mine Safety Appliances Company, Pittsburgh, told the Mine Inspectors Institute of America that a new foam generator has been developed to fight mine fires that are no longer accessible to direct attack and sometimes must be sealed off. He spoke at the Institute's meeting in Pittsburgh, Wednesday, June 21.

Mr. Alston said that the new machine makes it possible — for the first time — to direct high-expansion foam into a dead-end mine entry from distances up to 250 feet.

"Moreover," he added, "the fact that the generator can be brought into play minutes after the fire has started makes it ideal for use in controlling mining machine fires."

The foam generator — called the M-S-A "Foamaker" — consists basically of an axial vane fan mounted on a rubber-tired truck, a foam-mixing chamber, and 24-inch plastic tubing in lengths up to 250 feet. In operation, the fan is first turned on to unroll the plastic tubing in the direction of the fire. Then, full-cone spray nozzles play 10 gallons of water a minute mixed with the foam agent onto a specially designed screen. The fan forces the foam at

a maximum rate of 5000 gallons a minute through the plastic tubing and into the fire areas.

Mr. Alston pointed out that the foam will act on the fire even though the tubing does not score a direct hit. If the tubing is too long, it will automatically be burned off, allowing the foam inside to play its role. If it passes the fire or is only in the near vicinity, the natural "pull" of the heat will draw the foam to the fire area.

The MSA engineer said that the "Foamaker" was the result of years of research and development in cooperation with coal mining industry and the U. S. Bureau of mines.

● **PENNSYLVANIA COAL OPERATOR PURCHASES FIRST MACHINE OF NEW TRACTOR MODEL . . .** The newest tractor designed for high production earthmoving on highway construction and coal stripping jobs . . . weighing over 46 tons and operated by finger-tip control of a single lever . . . was purchased by a regional coal operator during its initial showing at the 1961 Coal Show in Cleveland, Ohio.

Robert D. Baughman (center) of the Robert D. Baughman Coal Company, Brookville, Pa., is congratulated on his new acquisition by Wm. H. Dickey, Vice-President and General Manager of Beckwith Machinery Company. Beckwith is the Pennsylvania Caterpillar dealer who sold the 92,060 lb., 385 HP, Cat D9, model G. Dean Crawford of Crawford Drilling Company, Brookville, Pa. (left) looks on.

The new model D9, which attracted unusual attention because it was painted white for show purposes, is claimed to offer new production potentials and incorporates many design features new to the heavy tractor market. Among these are controlled turbocharging, new after-cooler, oil-cooled steering clutches and brakes, new planetary final drives and an exclusive power shift which gives the operator finger-tip control of his machine.



Even if you don't need  
the **world's largest**  
and most powerful  
rotary blast hole drill—

to get the **MOST** hole at  
**LOWEST** cost, you need a

## **REICHdrill**

We will send you records made by  
REICHdrills working side by side  
with other rigs of same size.

Model C-950  
REICHdrill

← This world's largest, Model C-950 REICHdrill is owned by Sullivan Trail Coal Co., operating at Hazleton, Pa. Drilling 12 1/4" holes in broken sandstone and conglomerate rock, with much faster penetration than any other drill rig on the market.

Maximum down pressure 90,000 lbs. Weight with tools, 180,000 lbs. Infinitely variable drill rotation speeds, 0 to 75 rpm. Piston pumps and motors.

Drill stems are added and withdrawn by automatic control from operator's cab. Complete hydraulic control. 3 Chicago Pneumatic compressors deliver 1800 CFM at 125 psi.

What size drill rigs are you using? You can get faster drilling at less cost with a REICHdrill—all sizes from 5,000 lbs. to 90,000 lbs. down pressure.

Buy on **PERFORMANCE**. Maybe we can arrange a demonstration on your own work. Can send you convincing competitive records. Write, Wire or Phone —

### **FRANK SWABB EQUIPMENT CO.**

Hazleton National Bank Bldg.  
Hazleton, Pa., Ph. GLadstone 5-3638





## HERE AND THERE IN THE COAL INDUSTRY

● The Western Pennsylvania Coal Operators Association, at its annual meeting May 24 in Pittsburgh, elected the following officers: President, G.O. Tarleton, president, Pittsburgh Coal Co. division of Consolidation Coal Co.; vice president, J. Allan Brookes, manager, Mather Collieries; executive vice president, Harry A. Sutter; treasurer, M. C. Briggs; secretary, Earl Glass. The following were elected to the board of directors: Charles B. Baton, Robert I. Billings, Mr. Brookes, S. M. Cassidy, James E. Elkin, James S. Gelston, J. C. Jamison, Jr., R. H. Jamison, Jr., Walter F. Schulten, G. A. Shoemaker, W. G. Stevenson, Mr. Tarleton, and James R. Wilson.

\* \* \*

● Huston St. Clair, president of Jewell Ridge Coal Corp. and Jewell Ridge Coal Sales Co. since 1939, has been elected chairman and chief executive officer of the companies.

Directors at a meeting here also elected Robert W. Bruce president, chief administrative officer, and a director of the two companies. He leaves the post of senior vice president of the Pittsburgh National Bank to join Jewell Ridge.

A 1935 graduate of Bucknell University, where he majored in business and finance, Mr. Bruce embarked upon a banking career with the National City Bank of New York. After serving as a commissioned officer in the U.S. Navy during World War II, he became an official of the Fidelity Union Trust Co. of Newark, N. J.

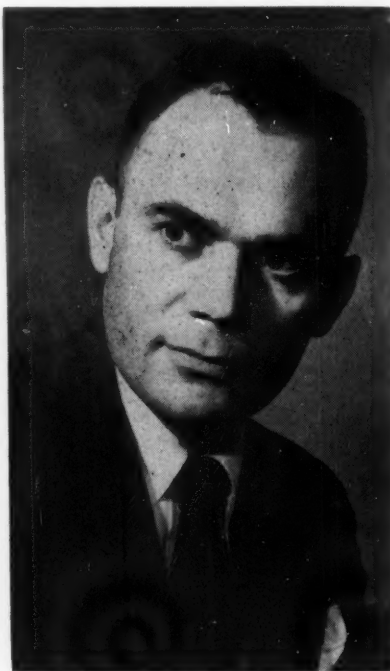
In 1956 Mr. Bruce was elected vice president of the Peoples First National Bank and Trust Co. of Pittsburgh. When that bank merged with Fidelity Trust Co., he became senior vice president of the new company, Pittsburgh National Bank, in which capacity he acquired wide experience in matters affecting

the coal and other industries.

Mr. Bruce is a member of the Association of Reserve City Bankers, Pennsylvania Bankers Association, and the American Bankers Association. Married, with two children, Mr. Bruce is a member of the Longview Country Club, Baltusrol Golf Club, and the Duquesne Club of Pittsburgh.

He assumes his new duties with Jewell Ridge on August 1.

\* \* \*



Robert R. Lucas

● Election of Robert R. Lucas as secretary-treasurer of The S. K. Wellman Company, Bedford, Ohio, is announced by Robert W. Biggs, president.

A graduate of Harvard College, Mr. Lucas is also a graduate of Cleveland-Marshall Law School. He is a member of the Ohio Bar and a registered C.P.A.

Prior to joining Wellman, Mr. Lucas was assistant to the president, Pittsburgh Chemical Co.,

## Do You Know?

● Schools have a responsibility to provide children with "an orderly intellectual experience" in science studies, included as "a regularly scheduled part of the curriculum in all grades," the American Association for the Advancement of Science believes.

A study report by the association calls for a ten-year sequence of coordinated science instruction, from kindergarten through the ninth grade, as part of a program to improve science and mathematics teaching at the elementary and junior high school levels.

No attempt should be made to develop a single program fitting all school systems, the AAAS said. Subjects and orders of progression should be chosen to meet existing situations.

Early scientific training is important, they said, because children form "their basic attitudes, patterns of thinking and modes of behavior" during early years. All persons should be equipped "for life in a scientific and technological society."

At the elementary level, teaching should have "flexibility and variety," without being limited to single disciplines such as biology, chemistry or physics. Basic ideas drawing on all sciences for example should be presented within "a well-defined structure." Emphasis should be on "the spirit of discovery" rather than memorization of facts.

By the time he enters the tenth grade, the student should have a working knowledge of such aspects of science as "the distinction between operational definitions and theoretical definitions, the relationship between speculation and observation, and the displacement of one theory by another."

New course materials must be developed and new teacher training methods evolved the report stressed. A national steering committee to direct the necessary planning was recommended. It would be composed of scientists, educators, learning specialists, teachers and supervisors.

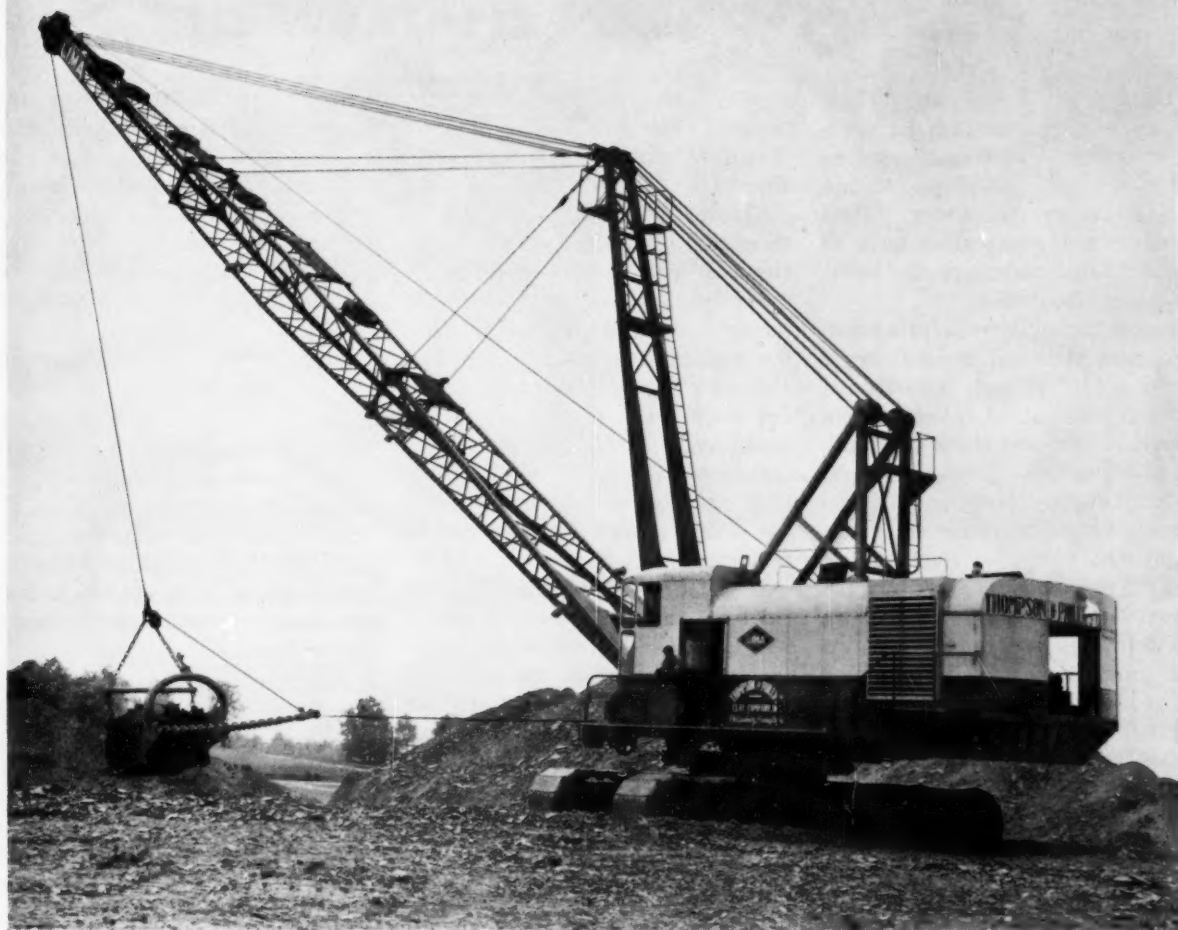
The report, an outgrowth of conferences this year at Washington, St. Louis, and Berkeley, Calif., was published in the current issue of Science (June 23). The National Science Foundation sponsored the study.

Pittsburgh, Pa. His experience includes service as production manager of Brush Electronics Co., a division of Clevite Corp., Cleveland.

The S. K. Wellman Company is a leading manufacturer of all metal brake linings, brake blocks, clutch plates and facings.



# 29 years is a long time!



Lima 2400 at Thompson & Phillips Clay Co., Inc., Philipsburg.

...since 1933, Highway has furnished Lima Shovels and Draglines to the coal industry.

The equipment "know-how" gained during this period . . . the vast store of Lima experience possessed by Highway engineers . . . the coal industry's finest shovel repair facilities! These are yours for the asking.

May we suggest . . . see your *Highway* representative, today!

A-5274A



## HIGHWAY EQUIPMENT COMPANY

6465 Hamilton Ave. • Pittsburgh 6, Pa.

40 Hoover Ave. • Du Bois, Pa.

5245 Peach St. • Erie, Pa.

Allis-Chalmers • Master • Lima • Thor

Heltzel • Gar Wood • Jaeger

Buffalo-Springfield • Lippmann Crushers

Rogers Trailers

# STOP THESE THIEVES

## ... They're Stealing Your Efficiency

By Ernest W. Fair

"Some days I know I should better have stayed home in bed. Nothing goes right . . . everything I do and everything the people on my staff do turns out wrong. Does a coal company executive have to consider these normal or can he do something about them?"

So goes the unhappy refrain heard every now and then in each corner of the land. Though it is always happening it should never be considered normal and there are many things we can do about such days.

Unfortunately there is no single formula or set of rules which can supply the cure all. Such deficit days in our business lives can be caused by many things. But we can definitely not only cut down their number in any given period but reduce their harmful effect by waging a constant battle against a certain set of sly thieves who rob us of our business efficiency constantly. They normally go unrecognized as such. They are the minor hidden factors which reduce one's working ability not only insofar as one's own productive effort is concerned but the ability to get top results from the people on one's staff.

Here is a list of the most common efficiency robbers and what we can do about them. Each in itself seems unimportant and therein lies the big danger. All are very important. Two or three taken together can in a single day nullify a week of good productive effort.

**Headaches**—"They're a minor inconvenience a good executive learns how to put up with or handle with a few pills." That comment borders on stuff and nonsense. The man who lets headaches diminish his effectiveness never finds a solution with temporary relief pills. Find the medical causes from your doctor . . . take the steps to be rid of them

forever. They damage before, during and after pain killing pills are taken; we simply are not aware of their effect on our abilities.

**Tiredness**—No man alive can be thoroughly efficient when he is tired. If we get tired before the day is even well under way something is wrong. Perhaps the trouble calls for medical treatment. Maybe it also calls for better scheduling of our work. Too many men set up heavy loads early in the day for they feel these can best be tackled while they are "fresh." Spreading them out is time proven to be a much better procedure.

**Irritability**—This little efficiency thief not only saps executive ability but causes that individual to disrupt the set efficiency of the people on his staff. A more relaxed attitude toward one's work . . . taking time out to take it easy now and then . . . better planning of the job . . . each of these can reduce executive irritation.

**Decrease of Interest**—Many an executive plans carefully to hold employee interest in their work for he well knows that without such interest any employee is always a less efficient individual. He completely overlooks the same effect upon himself. Whenever we are faced with a loss of interest in our job there is something very definitely wrong; such things do not happen overnight. Stand back from it and take a fresh look . . . talk it over with an old friend . . . new attitudes will come to light that will help to revive this interest.

**Irritation With Higher Ups**—No executive is immune from this efficiency thief; it can happen in the best regulated firms at any time. Usually it is brought on by misunderstanding either on one's own part or on the part of these higher ups. Blow off steam to yourself and that

will cast out this little robber. Keep brooding over it and he will remain to do more and more damage. Developing the flexible personality which permits such irritations to bounce away without penetrating our inner consciousness is a sure fire method of handling this particular demon.

**Loss of Patience**—Here is something the good executive guards against constantly. It is a standard requirement of being a top man that we forever exercise a high degree of patience with everyone . . . on our staff, associates, suppliers, customers, etc. If we maintain a constant guard against it we can nip such an efficiency robber before he can do major damage.

**Forgetfulness**—Any man's job can always be made much more difficult when forgetfulness sets in on him. Not only does it keep his business low but it virtually ruins top productive ability of the people who work with him. It is both a mental and physical problem. Usually the causes are of a personal nature. Some times we have to learn harder concentration to counteract it.

**Blueness**—Many personal problems can cause such a feeling. We tolerate it because we feel the damage is slight. Actually the reverse is true for this dejected condition in an executive robs him of better than half his normal efficiency. Maybe it takes great self discipline but we have to learn to leave these things outside of the job.

**Sleeplessness**—Too much bridge, too many parties, too much overtime work . . . these and many other things rob us of the very necessary sleep we need to be at top efficiency on the job. Some times bad health conditions can also do the damage. However, doctors tell us, more often

(Continued on Page 28)

# New **P&H** Dealer for Power Cranes and Shovels in Western Pennsylvania



Principals meet to sign P&H sales contract. Left to right: Jerry Raubach, Harnischfeger District Manager, Burt Thorpe, President of Thorpe Equipment Corp., and Jack Catalane, Harnischfeger General Sales Manager.



## Thorpe Equipment Corp.

3600 LIBERTY AVENUE • PITTSBURGH 1, PENNSYLVANIA

PHONE: MUsem 2-2575

Harnischfeger Corporation is proud to announce the appointment of Thorpe Equipment Corp., as their authorized dealer for the complete P&H line in the western half of Pennsylvania and the panhandle of West Virginia. Burt Thorpe, formerly associated with Harnischfeger's sales organization, is extremely qualified to give you complete, efficient service and prompt delivery on your parts needs. All sales and service personnel have extensive P&H experience and will specialize in the sales and service of P&H equipment exclusively.

### The P&H line includes—

Heavy-duty truck cranes from 12½ through 90 tons  
Crawler cranes from 13½ through 110-ton capacity  
Crawler excavators from ½ through 4½ cubic yards

For complete information on P&H equipment, parts and service or for an actual on-the-job demonstration, phone Thorpe Equipment Corp., today.

**P&H 890-TC—**  
World's largest truck crane—handles 250' of boom and jib. Featuring Magnetorque swings, this model 890-TC is the largest and most modern truck crane in existence. This model was delivered to Penn Erection and Rigging Company of Turtle Creek for use in W. Pa.



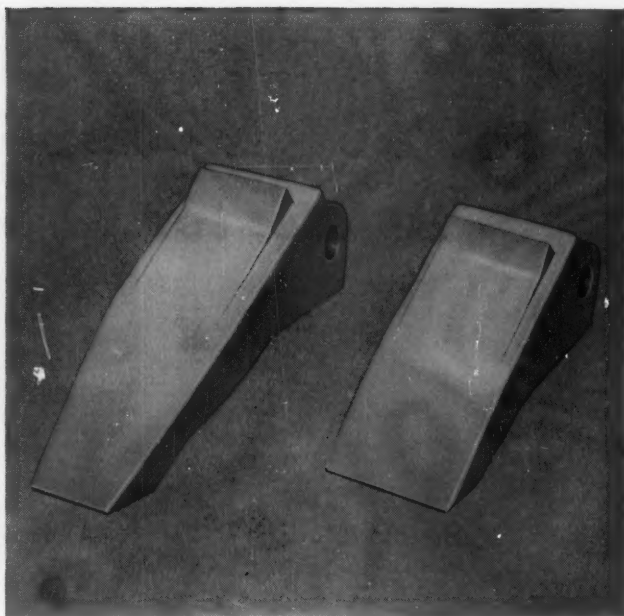
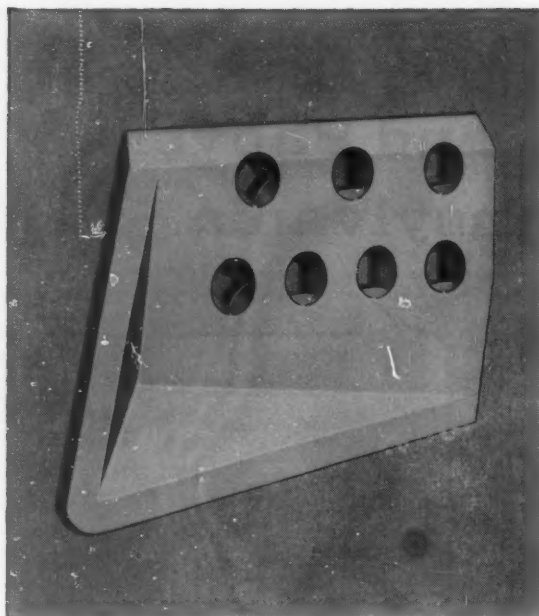
Model 1055B shovel embodies famous P&H features such as Magnetorque swing, live roller circle, independent planetary boom hoist and many more. Latrobe Construction Company, Latrobe, Pa., has recently placed a new model 1055B shovel on their road job in Hancock, Maryland.

**HARNISCHFEGER**

Milwaukee 46, Wisconsin







## SHARPENING INSTRUCTIONS:

*put 'em to work!*

### Cat's new-design end bits and ripper tips self sharpen, stay productive

Work them in rock or dirt and they won't lose their bite or efficiency until they finally need replacing. Caterpillar's new ripper tips have been field tested in caliche and partially cemented conglomerate against two other leading brands. The Cat ripper tips — starting sharp and staying sharp — turned in production which was greater by 25% and 50%.

The price? Same or lower than the other brands! The D8 and D9 short tip is \$13.65, and the long tip, designed for long life in abrasive applications, is only \$15.50!

There's good news for D7, D8 and D9 dozer owners, too. End bits for these bulldozers are now

forged from special alloy steel and then hardened to gain extra wear-resistance, longer life. And they're more productive, always ready to knife through any material, thanks to their self-sharpening design.

Both new parts can be adapted easily to machines now in the field.

Have our representatives explain how these newcomers and other ground-engaging tools — tips, bits, edges, teeth — can hold your production high, keep your costs down. Such vital earth and rock-cutting parts are constantly being improved through Caterpillar research developments in metal and design.

## CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.  
© 1961, Caterpillar Tractor Co.

### PARTS YOU CAN TRUST



... COST LESS TO OWN

#### BECKWITH MACHINERY COMPANY

Pittsburgh, Clearfield, Bradford, Erie,  
Somerset, Pa.  
Clarksburg, W. Va.

#### CLEVELAND BROS. EQUIP. CO., INC.

Harrisburg, Wilkes-Barre, Frackville,  
Philipsburg, Pennsylvania

#### OHIO MACHINERY CO.

Cleveland, Cadiz, Youngstown, Ohio

#### WALKER MACHINERY CO.

Charleston, Parkersburg, W. Va.





Caterpillar D-9 tractor moving loam and shale overburden in one of the pits.



Model 4500 Manitowoc dragline stripping overburden containing rock in the higher cover area.

## Use of Tractors for Stripping Is Increasing

R. D. Baughman operates several coal strip mines in the Northern Pennsylvania coal producing field. At his operation near Brookville, he is stripping the Kittanning coal which runs about 18 inches thick. Two pits are in operation in that area. At one of the pits where the coal seam has a loam and brown shale overburden on it the stripping is done with a Caterpillar D-9 tractor and the coal is loaded with a Model 3500 Manitowoc shovel having  $2\frac{1}{2}$  cubic yard coal bucket. At another nearby pit where the coal seam lies under 40 to 45 feet of overburden and contains a layer of rock, the stripping is done with a Model 4500 Manitowoc Dragline.

Moving up to 45 feet of cover, some of it containing rock, to get 18 inches of coal calls for a keen analyses of production costs of the various types of stripping equipment. Judging from the latest purchases of the type of equipment selected by this operator to meet his conditions, the trend is to large tractors for stripping.



Model 3500 Manitowoc shovel loading out coal in pit having shale overburden.

# High Sinking Rates at Kellingley

By C. K. G. Lamming, 4, Church Court, Richmond, Surrey, England

A new colliery is being sunk at Kellingley in the Castleford Area of the National Coal Board's North Eastern Division. When in full production it will be capable of producing at the rate of 6,000 tons a day, or about 1½ million tons of coal a year and will provide employment for about 3,000 men. Coal will be worked in an area about 4 miles square around the village of Kellingley, the area being crossed by the River Aire in the north and the Wakefield-Pontefract main railway line and the Aire-Calder canal in the south. The reserves of coal to be worked amount to 200 million tons, which is sufficient to give the new colliery a life of about 130 years.

Two shafts both 24 feet in diameter are now being sunk to a depth

of approximately 850 yards and for the first 50 years the output will be extracted from the Silkstone and Beeston seams which lie at depths of 2,087 and 2,298 feet respectively. Boreholes proved the existence of 600 feet of water-bearing permian measures to overlie the coal measures, the upper limestone being particularly heavily watered.

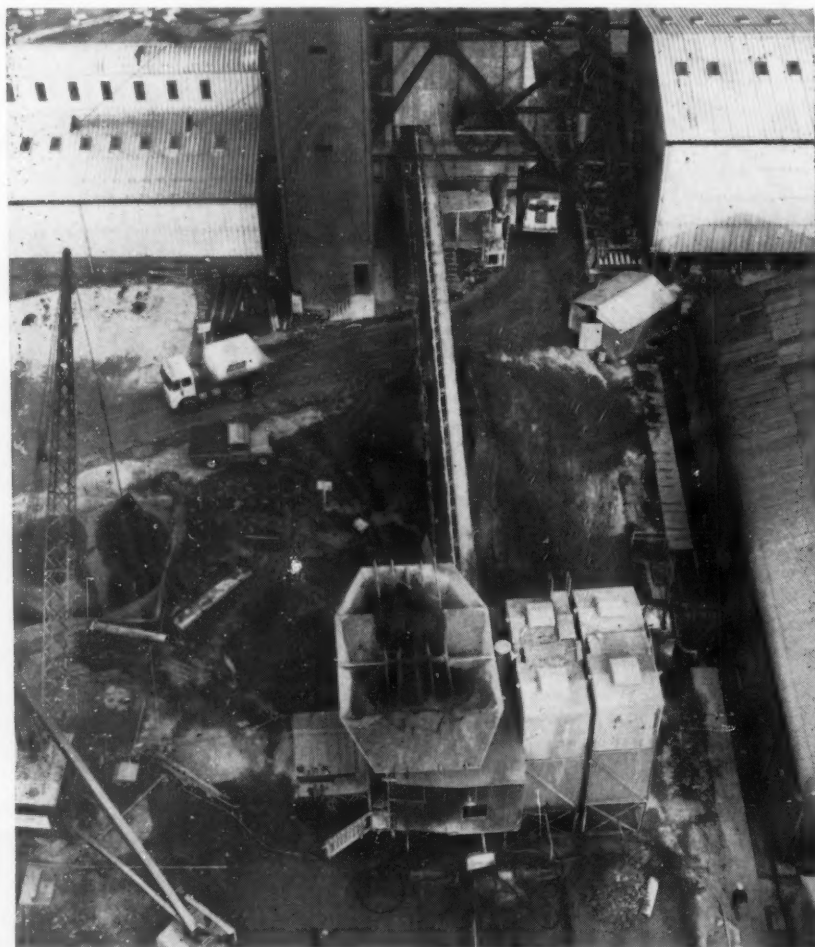
The use of brine freezing for water control, together with a non-simultaneous method of sinking and shaft lining, entailing a high rate of pouring and an extremely consistent mix are amongst the major features of this high speed shaft sinking which is being carried out by the Thyssen Shaft Sinking Co., Ltd., of London and Llanelly. The freezing process used to seal the shafts

against inflows from the strata was carried out by the Foraky Co., Ltd., 37 bores and one centre being employed to each shaft. Of these only two holes became sealed during sinking.

Notwithstanding the limitations imposed by the freezing process, high sinking rates were maintained during sinking through the frozen ground and when clear of this handicap, in the unfrozen ground a new record for shaft sinking was established in January when 336 ft. were sunk and 345 ft. lined in No. 2 shaft. This success particularly reflected the detailed organisation of the contractors, their close co-operation with N.C.B. officials and their use of high capacity plant such as the batching plant which guaranteed the maximum availability of large volumes of concrete having an extremely close consistency.

The main sinking of No. 1 shaft started on 26th February, 1960, and No. 2 shaft on 19th June, 1960. Each shaft is served by two tower-mounted friction winders, and these are being used for the sinking operation. After shaft sinking has been completed the winders will be fitted with closed loop-control, an electrical device to enable winders to be operated by remote control from the banksman's level. It is proposed to wind the output at No. 2 (upcast) shaft in 15 ton capacity skips; No. 1 (downcast) shaft will be equipped with two three-deck cages and be used for winding men, materials, and dirt.

The freezing principle employed at Kellingley consisted of maintaining a continuous sheath of frozen strata around the shafts during sinking, this being effected by circulating the brine through tubed boreholes which extend well into the non-permeable strata to ensure complete sealing of the shaft. The verticality of the bores is carefully controlled such that they do not intersect the shaft line and in order that each has approximately the same



The Blaw Knox A.P. 100 batching plant serving both shafts.

cooling area surrounding each tube. The freezing tubes which have screwed connections, are lowered as soon as a hole is completed, the first tube being plugged at its base. As successive joints are made, they are pressure tested for tightness upon which the success of the system depends. A small diameter tube is then inserted into the completed column and, after a final pressure test, connection is made with the brine mains, the refrigerant flowing down the small bore tube and up through the column to the mains on the refrigeration plant. The refrigerant is a solution of calcium chloride in water, the freezing point of which is -22 degrees F. at a specific gravity of 1.24. The surface brine mains are 8 in. bore and are lagged with a 2½ in. thick layer of insulating cork. At the refrigeration plant, liquid ammonia is evaporated at low pressure in tubular heat exchangers, the latent heat of evaporation being derived from the brine during its passage through the heat exchanger tubes. The ammonia gas is taken from the heat exchangers to high speed single stage vee type ammonia compressors, these being 6 cylinder machines driven by 150 H. P. A.E.I. slip ring induction motors. They deliver to banks of condensers which are cylindrical heat exchangers upon which cooling water is played, resulting in liquifaction of the ammonia before passing out through automatic expansion valves and on the brine heat exchangers. Each ammonia circuit is independent, the four circuits being used to give the maximum reliability in maintaining brine circulation. Some 1200 lb. of ammonia is used in each circuit. The brine circulation is some 70,000 g.p.h., maintained by two pumps, the brine containing some 70 tons of calcium chloride.

The circulation of the brine through the entire system results in long columns of frozen ground being produced round each freezing tube, the diameter of the columns increasing as freezing continues until they merge with one another and an ice wall is formed. As the ice

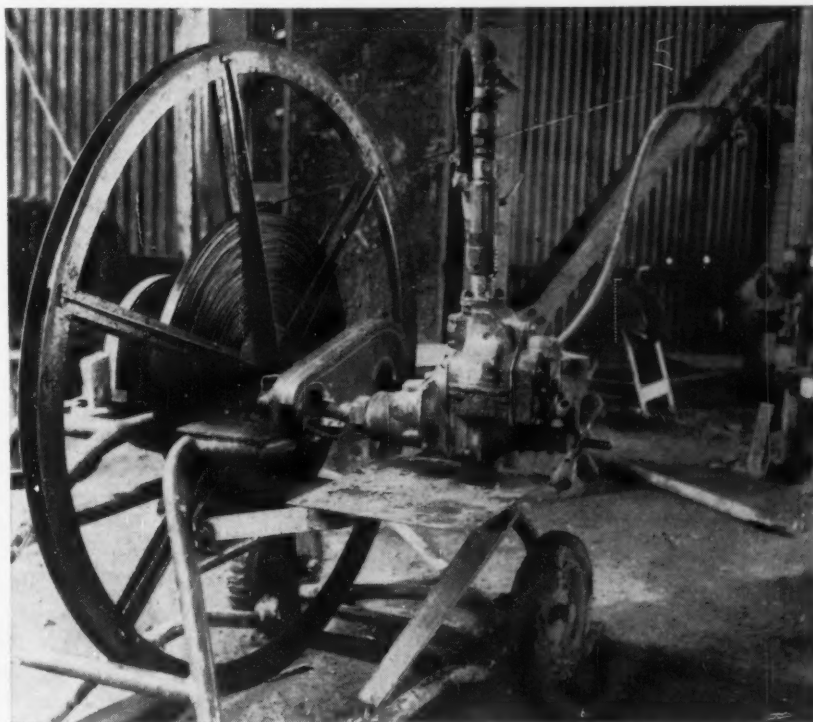
forms, water is displaced and when the ice wall is completed, careful measurements of the quantity and temperature of the water expelled through the pilot hole gives a useful indication of the extent to which the freezing process has progressed. Whilst sinking of the shaft is in progress, the refrigeration rate is maintained in excess of the melting rate due to the higher temperature of the surrounding rocks, the ice wall gradually thickening until it extends for some distance beyond the excavation and the unfrozen core has become completely frozen, thus forming one solid cylinder of frozen rock in which the shaft is sunk. When this is achieved, any faulty bore can be isolated from the mains without affecting the progress of the work.

Rotary drilling for the freezing bores began at the end of March 1958 and was completed in early September 1958, a total of some 49,450 ft. being drilled with the boring completed and the refrigeration plant installed, freezing at the site of No. 1 shaft was started on October 27th 1958, the ice wall being closed at the end of February 1959.

Commencing and closing dates for No. 2 shaft were December 15th, 1958, and July 9th, 1959 respectively, the resulting ice walls formed being some 80 ft. in diameter.

Sinking through frozen ground entails a number of particular considerations; of these, the first is concerned with limiting the amount of charge and determining the most suitable pattern to obviate damage to the freezing tubes by excessive shock waves. Drill penetration rates are usually much lower and a fairly high number of holes may be rejected. In particular, difficulties are experienced with ice fissures extending for many feet which cause the steels to become frozen into the ground.

With regard to shaft lining problems encountered here, include those due to the effect of the heat of hydration on the ice wall and its consequent expansion. With regard to shaft lining, of the greatest importance is the need to ensure the highest degree of consistency in the mix and the minimum amount of segregation during pouring. At Kellingley, the former condition was met by the use of a Blaw-Knox AP 100



Controlled raising and lowering of the shaft survey tape is effected by this Consolidated Pneumatic type 327R drill.



Gyramixer with delivery of the concrete via a conveyor to Blaw-Knox Roller Gate Hoppit and then to an octopus situated between the decks of the shaft stage.

A further feature of note is the accommodation required to be made to allow for the effects of surface lift. This feature resulting from the expansion caused by the formation of ice and variation of temperatures is sufficient to throw the permanent winding towers out of alignment. To enable corrections to be made, the tower bases are mounted on grilages with facilities for jacking in order to keep the towers level.

Account had also to be taken of the need for providing effective support for the weight of the shaft lining sinking through the frozen ground due to the fact that corrugated sheets prevent the concrete from adhering to the ground.

The majority of lining in the frozen ground is of 18" thickness, but towards the base of this frozen area, at 460 ft., the thickness of the lining was increased in steps from 18" to 24", then to 27", at this point the frozen ground ended. Below this level the lining was reduced in thickness from 27" to 24", then to 18" and finally to the normal ground lining of 12".

The main equipment used for the sinking, consists of a two deck stage which is suspended in the shaft by four ropes which also act as guide ropes for the riders of the hoppits. The decks are 30 ft. apart and surmounted by a catwalk 10 ft. above the top deck. The first or upper deck carries four 2 ton worm driven self stabilising winches for movement of the shuttering in the shaft. The air and water manifolds are also carried on this deck. Between the decks is located the octopus and chutes for emplacing the concrete lining, the chute trunking being of light gauge steel sections joined by chains to give flexibility in operation. Two columns for air and water services are also fixed between decks, the top manifolds receiving hoses from pipelines temporarily attached to the shaft lining.

Underneath the bottom deck of

the sinking stage is situated the mechanical loading equipment. This is compressed air driven and is suspended from an inner and outer monorail. The main hoist motor which operates the 20 cu. ft. Priestman Cactus grab, is also mounted on rails inside the unit, which then allows the grab transverse as well as circumferential movement. The 20 cu. ft. Priestman Cactus grab is of the compressed air, 6 bladed type.

The circular monorail is broken for a short section to allow the stage to be raised above the level of the services pipes fixed to the shaft wall and at the point where it is broken, an inner rail on a shorter radius is provided to maintain continuity. The drilling hoppit consists essentially of a number of radial steel sheet plates which form segments to which the drilling machines are returned after use. Each machine is numbered and a corresponding number is marked on each segment of the hoppit. Thus any defect in the drilling machine is noted on the plate forming the segment corresponding to the drill and is easily read off by the fitter on surface. The mucking hoppits, No. 1 shaft 85 cu. ft. and No. 2 shaft 105 cu. ft. capacity are secured to the winding rope by 3 suspension chains, the chains being detachable from the hoppits to leave them clear for loading.

The winders are part of the permanent mine installation. At No. 1 shaft a friction winder is driven by a 1,100 B.H.P. A.E.I. motor whilst at No. 2 shaft the winders are driven by twin 1,100 B.H.P. A.E.I. motors at 11,000 volts. The winder drums were modified during sinking to accommodate single rope winding. The towers are of steel construction and are fitted with deflection pulleys in order to bring the winding ropes into the correct position for sinking.

The prime requirement of an extremely high rate of production, coupled with an extremely consistent mix of constant water/cement ratio has been met by the provision of the Blaw Knox AP. 100 concrete mixing plant which has an output of 100 cu. yds. per hour and can feed

to either shaft. Essentially this plant consists of four sections, the first of which is an eight compartment batching plant which has an aggregate storage capacity of 100 cu. yds. a weighing unit and a control panel. Cement is stored in extendible bulk cement handling units. The main section of the plant are the twin Blaw Knox Gyramixers which have a mixed batch output of 28 cu. ft. A further section consists of two specially fabricated conveyors, constructed by Thyssen Shaft Sinking Co., Ltd., which take the concrete to either shaft and the 2 cu. yd. wet receiving hopper located here to receive the concrete before discharge to the 2 cu yd. Blaw Knox roller skips used for transport down the shaft.

The batching plant comprises three main units, these being the main bin unit which includes the operating platform and control panel, the supporting structure and aggregate weigher and a flared top section. The operation of the plant, through the control panel is by air assisted manual controls and weigh dials. Pneumatic rams control the radial gates feeding aggregate to the weigher, an air operated valve controlling the discharge of cement to an independent weigher. Water is metered out in a 35 gal. syphon type pressure tank calibrated in pounds and gallons and is discharged to the mix by a press button control. The containers operate at a pressure of 90 p.s.i., the supply being derived from the town mains supply. In addition to the hand operated valves for operating the main discharge rams, the control panel is also fitted with indicator lights which show such points as the position of the mixer door, the length of the mixing period and whether electric power is on for control operations.

The two "Gyramixer" stationery pan type units incorporated in this plant each have an unmixed capacity of 42 cu. ft. and a mixed batch output of 28 cu. ft. The overhead drive to each is a single, enclosed unit and the pan, fabricated from wear-resistant alloy steel, forms an

(Continued on Page 19)



CATERPILLAR

*Facts from your dealer*



## How will you figure your next job?

**Whether you bid big road projects or do grading by the hour, you're probably putting together costs for your next bid right now.**

Maybe you won't be thinking about a new job for weeks. Yet the work you're doing today is providing the facts—facts on operating costs, machine production, overhead—that will help in computing your next estimate.

The success of your next bid and the profit you earn can depend on the accuracy of this kind of information and how it is used.

The following pages will show you how we can help you gather some of this information.

# Today's Figures Determine Tomorrow's Bid...



**True comparisons  
can only be made  
with individual  
machine cost &  
production records**

As everyone knows, a business can not be successfully run without good cost records. But the best cost records are those kept on an individual machine basis. They point up exact fuel consumption, repairs (both parts and labor), lube oils, grease, filters and other operating costs.

At the same time, owning costs such as depreciation, interest, insurance and taxes should also be recorded for each machine so that *total* machine costs are known.

It's then a good idea to measure the work each machine can do. How much earth will it push or haul per hour?

With this information—a combination of costs and production potential for *each* machine—you're ready to figure almost any job. However, complete records are not always possible. Also, there's the problem of estimating the performance and costs of equipment you propose to buy. So let's take a closer look at each step.

## COSTS

**Owning Costs** — Ordinarily owning costs for each machine are constant—they go on day after day whether the unit is working or not. They include depreciation (decline in machine value due to age), interest, insurance and taxes. Keeping track of these

basic costs usually presents no problem. And you can work them into your next bid simply by extending them over the useful life of the machine on an hourly basis.

When you depreciate a piece of earthmoving equipment for estimate purposes, you probably will use a 10,000-hour (five-year) period and write the machine down to zero value. But keep in mind that all machines have some resale value\*, and this varies according to make (see box below) and condition.

**Operating Costs** — They include fuel, lubricants, hydraulic oil, cable, filters, repairs and operator's wages. Only way to pin down these costs accurately is to keep a complete set of individual machine cost records.

Such records give you both the basic facts to price your work accurately and some indication of which machines are producing most profitably and under what kind of operating conditions.

Accurate records also will spotlight apparently small costs which add up over a period of time. Fuel consumption alone can make a big dollar difference when spread over the useful life of the unit. One unit burning as little as two gallons per hour more than a similar machine can build a \$3,000 difference over a 10,000-hour period.

Another cost which only accurate records can show fully is down time. True cost of down time can vary according to the job. A general utility tractor, for instance, could be in the shop for days and cause little loss in production. When a pusher tractor breaks down, on the other hand, it can hang up three or four expensive wheel rigs. So the biggest expense of down time can show up in lost production after the actual repair costs have been duly recorded. Some contractors show down time in their individual machine records as "per cent availability;" others actually charge a rental rate against the machine, whether or not it must be replaced temporarily by another unit.

We can help you start a system of cost records, if you feel your present methods are not adequate. For instance, we can supply you with record books for entering costs on a daily basis and for accumulating costs monthly and yearly.

## \*RESALE VALUE

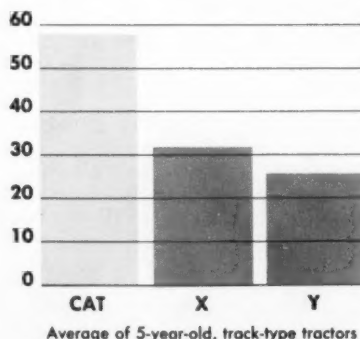
On the positive side of your cost picture is the resale value of the equipment you own and are depreciating. Every machine, regardless of condition, has some salvage value.

With most contractors, the equipment they own is a major portion of their net worth. And, if they happen to own Caterpillar equipment this part of their net-worth picture will look 10 to 25% better!

For example, the graph at the right gives you a relative idea of the value of five-year-old, track-type tractors from three major manufacturers. Note that even after five years Caterpillar machines hold more than 50% of their original price.

These figures are based on Forke Brothers' 1960 auction prices—the values contractors themselves set on used equipment. They are averaged from more than 50 auctions across the country as reported in the "Blue Book" of auction values.

AUCTION PRICE AS A % OF ORIGINAL PRICE



We can help you estimate owning and operating costs for any Cat machine. We'll use methods based on years of experience working with machine costs.

In summary, here are the costs you'll want to record or have our representative estimate with you:

**OWNING COSTS:** Depreciation—Interest, Insurance, Taxes.

**OPERATING COSTS:** Diesel fuel—Gasoline—Lube oil (crankcase, transmission and final drives)—Hydraulic oil—Filters—Grease—Tires—Repairs, including labor—Operator's wage.

This furnishes you with individual machine records. Not included, of course, are your overhead costs: supervision, transportation, office expenses, etc.

Costs, however, give you only half the story. Still to be figured is how much each machine will produce.

## PRODUCTION

Have you ever watched someone guess how much dirt is in front of a dozer blade or "eyeball" a scraper load... and then miscalculate production by a country mile? It happens every day.

That's why we weigh loads and conduct time studies. We can bring a set of electronic scales to measure scraper or truck loads on your job, and our specialist can help you work out cycle times.

This applies especially to equipment you plan to purchase. When we demonstrate equipment, much of the guesswork is removed.

As we mentioned earlier, the best way to compute production and costs is to use your own records. But estimated costs can give you a good indication, too. Here's how one contractor used estimated costs and actually measured production to determine which of two new machines would be best for a job on which he was working.



## JOB ANALYSIS

This project involved slot dozing silty clay—one blade width in a 100-ft. digging pit. The contractor had two questions he wanted answered: which of two crawlers being demonstrated could give the best dozing production... and which would turn in the lowest cost per cubic yard.

The Caterpillar machine—a D8H—had a straight dozer blade and Cat power shift transmission. The other make machine was also equipped with straight blade and power shift transmission. The test pits

were staked out side by side to insure uniformity of material. The same man operated both machines.

First step was to estimate hourly owning and operating costs, making sure costs were computed by the same method. Here's how they compared using the simple cost breakdown shown earlier:

OWNING COSTS	HOURLY COSTS	
	D8H	Other
Depreciation . . . . .	\$ 4.22	\$ 4.12
Interest, Ins., Taxes . . . .	1.26	1.24
<b>OPERATING COSTS</b>		
Diesel Fuel . . . . .	1.23	1.05
Gas, Lube Oil Filters . . . .	.18	.18
Repairs . . . . .	3.80	3.71
Operator's Wage . . . . .	3.00	3.00
<b>TOTAL . . . . .</b>	<b>\$13.69</b>	<b>\$13.30</b>

The D8H estimated owning and operating costs were higher because the initial cost was more (resale value was not considered) and, since the D8 has a higher horsepower rating, the fuel costs were estimated higher.

Next step was to measure production.

Both machines were time studied for 30 minutes so that average cycles could be compared. Average push distance was 94 ft. for the D8 and 93 ft. for the other machine. The results?

The D8 proved its superiority by moving more dirt per pass (4.5 yd. to 3.4 yd.) and by moving it faster (36 cycles to 31).

An examination of the cycle time showed that the D8 picked up a full blade load faster than the other machine (.42 min. to .52 min.). Once the blade was full both machines upshifted and dozed the material to the spoil area in .18 min. Reverse time was less for the D8 (.24 min. to .27 min.).

Actual production in bank cubic yards (based on a 50 min. hour—83% efficiency) came to 268 for the Caterpillar machine and 177 for the other machine—a 51.4% advantage.

Thus, the first of the contractor's original questions was answered. The D8 would get the job done faster. But how about the other machine's lower hourly cost? Would the extra production of the D8 offset the other machine's lower initial price and operating costs—turn in a lower cost per yard?

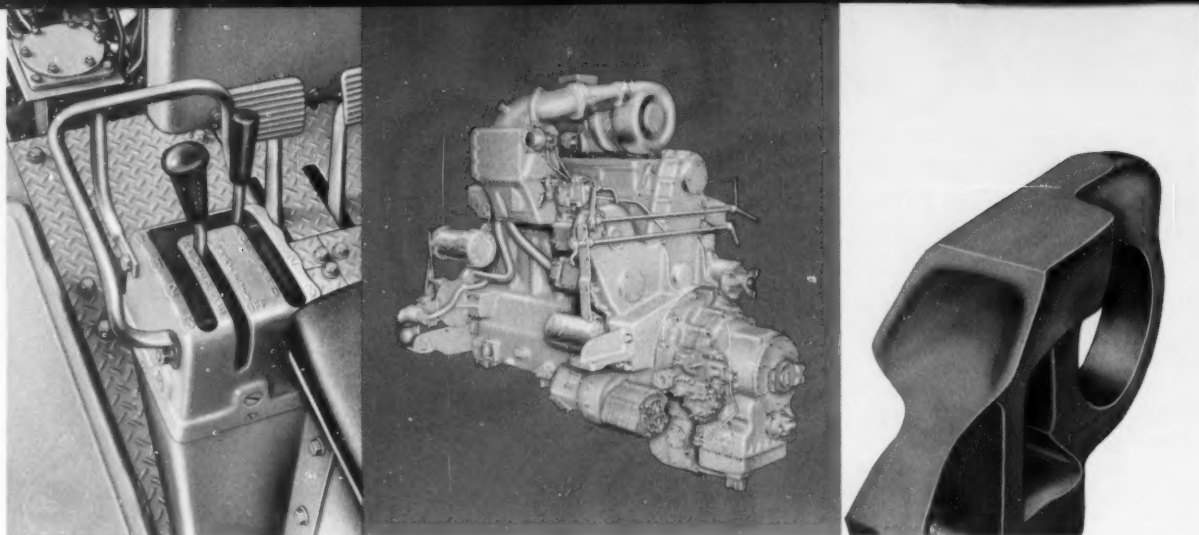
By dividing estimated hourly costs (shown above) by hourly production, you can see the answer.

D8H	OTHER
$\frac{\$13.69}{268} = 5.1¢ \text{ per yard}$	$\frac{\$13.30}{177} = 7.5¢ \text{ per yard}$

Suppose the contractor was working eight-hour shifts. In three days the D8 could move about 6400 yards—2100 more than the other machine. And its cost per yard would be 32% less!

**How will you figure your next job?  
WITH COST AND PRODUCTION FACTS?  
LET US HELP YOU GET THEM!**





## New advances affect machine costs, production

**CAT-BUILT POWER SHIFT**—Obviously, a power shift machine will outproduce a straight stick machine. But how about two similarly equipped power shift machines? That's where job studies as shown on the previous page prove conclusively the superiority of the Cat-built power shift over competitive units. With exclusive Caterpillar torque divider the D8 power shift combines the snap and economy of direct drive with the anti-stall and load matching ability of a torque converter. The operator shifts on the go under full load in a split-second without clutching or braking—and his arm never leaves the cushioned arm rest on the seat. The power shift transmissions available for Cat-built crawlers, loaders and wheel tractor-scrappers have been specifically designed for each particular machine application. Although different in design details, all power shifts add up to the same thing: faster cycles, steadier production.

**NEW-DESIGN CAT DIESEL**—Caterpillar Engines are designed for the utmost in dependability, economy and servicing ease.

The unique fuel injection system—an individual fuel pump for each injector and capsule-type injection valves—makes field adjustments unnecessary, simplifies rebuilding. Use of the precombustion chamber gives Cat Engines the highest lugging ability in the industry. It provides extra pull when other machines need shifting into a lower gear range. Because of the precombustion chamber design, expensive premium-fuels are not needed.

**PLUS MANY MORE ADVANCES TO CUT COSTS, IMPROVE PRODUCTION**—There's a new "Hi-Electro" hardened track link for the D6 Tractor and Cat 955 Loader—a heavier link for the D7 plus new-design dozer end bits and ripper tips for D8s and D9s. These are part of a constant stream of improvements that lower operating costs, help minimize down time. Also there's a new D9 Tractor and a new 619 Tractor-Scraper—both bigger producers than previous designs. Any one of these new advances could have a significant effect on your next bid. Let us help you get the latest cost and production facts.

# CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

## BECKWITH MACHINERY COMPANY

Route 22 East, P.O. Box 8718, Pittsburgh, Pa.  
Old Town Road, Clearfield, Pa.  
361-369 Congress St., Bradford, Pa.  
1356 E. 12th St., Erie, Pa.  
Route 219 North, Somerset, Pa.  
Buckhannon Pike, Clarksburg, W. Va.

## OHIO MACHINERY CO.

6606 Schaaf Road, Cleveland, Ohio  
U.S. Route 250, Cadiz, Ohio  
4000 Lake Park Road, Youngstown, Ohio

## WALKER MACHINERY CO.

Route 60 East, Charleston, W. Va.  
4010 Emerson Ave., Route #2, Parkersburg, W. Va.

CM-13



(Continued from Page 14)  
integral part of the base structure, which allows shallow mixing and eliminates the need for a central pedestal. Discharge is through a 13½ sq. ft. rectangular sliding door, the movement of which is ram controlled. The mixing unit consists of a rotary gear box which revolves round the center of the pan. It carries two stars, each rotary about its own axis and is fitted with three mixing blades. Floor and wall scraping blades are also attached to the rotating gear box. The stars rotate at unequal ratio and the blade path is such that the entire pan area is covered once in each revolution. With these mixers, batch time throughout the contract was 30 seconds.

The specifications require a minimum strength of 4,500 lb./sq. in. at 28 days in frozen ground, the average figures obtained to date being 7,000 lb./sq. in. In unfrozen ground the specification is for 3,000 lbs./sq. in. the average figure reached here being 6,000 lb./sq. in. at 28 days. During the lining in frozen ground, Sulfacrete was employed, Earles Portland cement being used in unfrozen ground.

The aggregates are closely checked for organic content, moisture size, etc., and the aggregate pits are heated with steam pipes to maintain an even temperature and hence control the moisture content. The container on the batching plant is also heated, thus guaranteeing uniformity of mix and moisture content. The mix used in the frozen section was: 0.296 tons cement, 0.429 tons sand, 0.729 tons gravel, 12 gallons water. In the unfrozen ground the mix was: 0.239 tons cement, 0.594 tons sand, 0.880 tons gravel, 18 gallons water.

The sinking routine in frozen ground was dominated by the necessity of ensuring that the freezing tubes were not damaged by excessive shock waves. Thus in this section, a 3 square draw cut, comprising twelve holes, followed by a round of 64 holes was adopted and in order to rationalise the drilling as far as possible, the floor of the shaft was divided up into quadrants

and the cut, two machinemen being permanently allocated a section. Thus, in the cut, the two most experienced drillers were located, each drilling the full depth of six feet and working on diametrically opposed holes. In the quadrants, the first of the two drillers worked to a depth of 4 ft. 6 in., continuously, the second machineman being permanently engaged in deepening these holes to 6 ft.

Ice fissures of up to 30'-0" in depth and 6" wide caused considerable difficulty when drilling throughout the frozen ground. The frictional heat generated by the rotating bit causing a rapid thaw of the ice, which in liquid form was blown up the hole, refreezing in the process. Thus large numbers of holes were rendered useless, by the drill steels becoming completely frozen in their holes.

Modification of the drilling machines to allow for high volume blowing of C/A at the tip, in order to cool the bit and remove from the hole any liquid formed before refreezing took place, met with some success.

Integral drill steels with cross bits were used throughout the frozen ground, but it did not prove ideal for normal ground. Here integral steels with chisel bits produced far better results.

Charging of the boreholes is carried out by N.C.B. deputies assisted by Thyssen personnel. The amount of explosive to be used in any one round in the frozen area was limited to 150 lbs. to ensure that excessive shock waves were not set up, which could possibly cause damage to the freezing tubes. The depth of the rounds varied between 6'-0" and 10'-0" according to the strata encountered.

This limitation of explosives made it necessary to fire twice for each full round of holes bored, the outer or cropper holes being fired separately from the rest of the round. Parallel mains electrical firing was employed.

To reduce charging time to a minimum, the buss bars are prepared on surface in a Priming Shed. The buss bars are laid out in accordance with

plans displayed on a wall panel which show the exact positions for attaching the detonator leads. These leads terminate in "inert" primers which consist of plaster of paris containing an outer groove for the detonator leads, the detonator being inserted firmly through the centre of the plaster of paris such that it protrudes approximately ¼ inch into the following stick of explosive. Non-inflammable, sand filled, paper bags are used for stemming.

Smoke clearance is effected by a booster fan in the main 30 in. air services column which is carried down as shaft lining proceeds. The stage is raised 150 ft. before firing and the shaft is inspected before it is lowered after firing. With the stage in position, mucking commences, using 4 hoppits. Thus, whilst the grab fills a hoppit on the East side of the shaft, the west winding rope drops an empty hoppit on the west side of the shaft and picks up a full one. When the hoppit on the East side is full the grap swings around and commences loading on the West side.

Loading is always arranged to take place underneath the winding rope carrying the full hoppit to the surface.

The temporary support employed in frozen ground consists of steel channel rings, suspended on hooks, with dowels inserted in the ground every 5th ring to provide additional security. Behind the steel rings are placed corrugated steel sheets held against the ground by timber poling boards and wedges.

Sinking and lining routine in coal measure strata was to sink 40 ft. and to line this section immediately. During sinking, the ground was secured by wire mesh and anchor bolts which were placed at a minimum depth of 4 ft. into the rock. This system could not be worked in the frozen ground due to the presence of the corrugated back sheets which prevented the concrete adhering to the ground. The following procedure was therefore adopted.

- 1) 40'-0" of shaft was sunk and back sheets placed only in the top 30'-0".

- 2) A concrete crib was placed in

this bottom 10'-0" section which was in immediate contact with the ground.

3) Sufficient waiting time was allowed to elapse before sinking further to allow this crib to gain strength. Only in the 1st crib placed in either shaft was this waiting time required.

4) A further 40'-0" of shaft was again sunk, and again only the top 30'-0" back sheeted.

5) Another crib was placed in this bottom 10'-0".

6) As soon as this crib was placed, lining of the first 30'-0" (Item 1) took place.

This procedure was followed throughout the frozen ground, and allowed each crib sufficient time to gain strength to support the 30'-0" section above it.

The lining was emplaced in 5 ft. lifts, the shuttering consisting of two 2 ft. 6 in. high rings of  $\frac{1}{4}$  in. steel plate used with releasing segments. In frozen ground, provision was made in every 5 ft. lift for 8 injection pipes, with a further 8 being located in the cribbing. The grouting was carried out within 10 days of placing any part of the lining, whilst local thawing of the ice was occurring. For each 40 ft. section, some 20-30 tons of cement were injected, using a Boulder grouter.

The grouting was carried out at a maximum pressure of 60 p.s.i. The mix was prepared on surface in a tub fabricated from a section of ventilating tube, in which rotating paddles are located, these being powered by a Consolidated Pneumatic type 327 drill. From the mixers, the grout passed by a 2 in. plain flanged gravity line down the shaft, this terminating in a rubber hose which connected with the Boulder grouter, situated on the sinking stage. A  $\frac{1}{4}$  inch air line was taken from the stage manifold to the grouter, which has a pressure reducing system.

The Boulder Grouter, which incorporates its own agitating chamber uses some 80 c.f.n., and has a chamber capacity of 4 cu. ft. The high degree of agitation provided by the grouter was particularly important

during the operations, in ensuring the injection of a high quality grout.

The concrete is brought down the shaft in Blaw Knox 2 cu. yd. concrete skips, these discharge to a folding chute, from the base of which is led four trunk ranges, thus splitting the concrete equally into four parts. Each section of the light steel trunking is cone-shaped and has hooks at its base to allow other sections to be attached by chains, this arrangement also giving the maximum flexibility and ensures that concrete is placed without segregation taking place. Of particular importance is the achievement of a thorough vibration to eliminate voids and ensure uniform compaction. This is carried out with Consolidated Pneumatic 325 poker vibrators. During the placing of the lining provision is made for pipe clamp supports, safety rope support, and also Bunton boxes for cross girders for guide rails.

Holes to accommodate steel pins for the Stage safety ropes are placed every 40'-0" and also attached to these pins are pulleys to facilitate movement of shuttering in the shaft. The ropes from the 4 winches on the top deck are passed around these pulleys and then attached to the shuttering at 4 points. Four safety ropes are attached to the stage during mucking operations, to prevent overload on the guide ropes.

Temporary supports are used in the coal measure strata B.R.C.13 gauge wire mesh, 3"x3" squares in sheets 6'-0"x14'-0" and 4'-0" roof bolts with Rawlshields and 9"x7"x $\frac{3}{8}$ " steel plates.

Where ground conditions were normal, roof bolts were placed in rows, 5'-0" between each row to allow 1'-0" overlap on the wire mesh sheets. If the ground conditions deteriorated, double sheets of wire mesh were placed and extra roof bolts were inserted where necessary.

Occasionally it was found possible to recover a small percentage of the roof bolts during concreting operations, but this depended entirely on ground conditions.

A lazy chain method of muck tipping is employed at surface, the tipping level being fitted with interlocked, pneumatically controlled doors such that the muck chute loading the storage bins from the hopper, cannot be lowered without the bottom shaft doors being first closed. The lazy chain which lifts the bottom of the hopper is also arranged such that it cannot be applied unless the muck chute has first been lowered.

Twenty shifts are worked each week, the N.C.B. taking over the shafts on Sunday dayshift each week for maintenance and testing of their equipment.

Each shift is of 8 hours duration with a 30 minute break for food.

Underground each shift consists of:

1 Grab Driver
1 Foreman
8 Sinkers
1 Chargehand
2 Onsetters

Output from No. 2 Shaft during the record breaking month was some 15,000 tons of rock excavated and 2880 tons of concrete emplaced.

The establishment of new high sinking rates at this site by the contractors, reflects to a considerable degree the detailed attention given all aspects of the sinking routine. This is particularly reflected in the attention given to such points as the provision of drill hoppers and the use made of small portable air motors to provide power for such operations as grout mixing, tape winding, etc. These motors are, in effect, Consolidated Pneumatic type 327 reversible drills which are welded to suitable frames and which, in the case of tape winding, provide an extremely convenient method of raising and lowering the shaft measuring tape without damage.

The shafts are being sunk by the Thyssen Shaft Sinking Co., Ltd., of London and Llanelli, for the No. 8 (Castleford) Area of the N.C.B. The freezing and sinking contracts are being supervised by Mr. J. J. Gill, Divisional New Sinkings Controller, the Agent for the Contractors being Mr. E. Bornemann. The Master Sinker of No. 2 Shaft, in which the new record for sinkings of this category was established, is Mr. R. Elkan.



Largest dragline on single crawlers, this 10-yard long range electric dragline, permits more economical recovery of special high-grade clay from extensive seam in central Pennsylvania. In replacing smaller, diesel-powered P & H unit, new electric machine's larger bucket and longer boom have almost doubled production pace on 11-year-old operation. Equipped with P & H Magnetorque control for swing, propel, drag and hoist functions, unit averages 4,000 cubic yards per each of two 8-hour shifts daily in stripping up to 50-foot deep overburden from fresh "box" cut. On future passes through adjoining, already broken surfaces, owners look for even greater output.

## Ten Yard Electric Dragline Used by Aughenbaugh Coal Company

Low cost stripping with the world's largest dragline on a conventional two-crawler mounting has effected a marked increase in economy for Aughenbaugh Coal Co. of

Clearfield, Pa., in removing up to 50 feet of overburden from a seam of high-grade clay.

Operators of two bituminous mines in Virginia (Vasant and

Dominion Coal companies), the Aughenbaugh firm has been working the Pennsylvania clay deposit since 1950. It is stripping an extensive seam along the south branch of



the Susquehanna River between Curwensville and Lumber City, Pa.

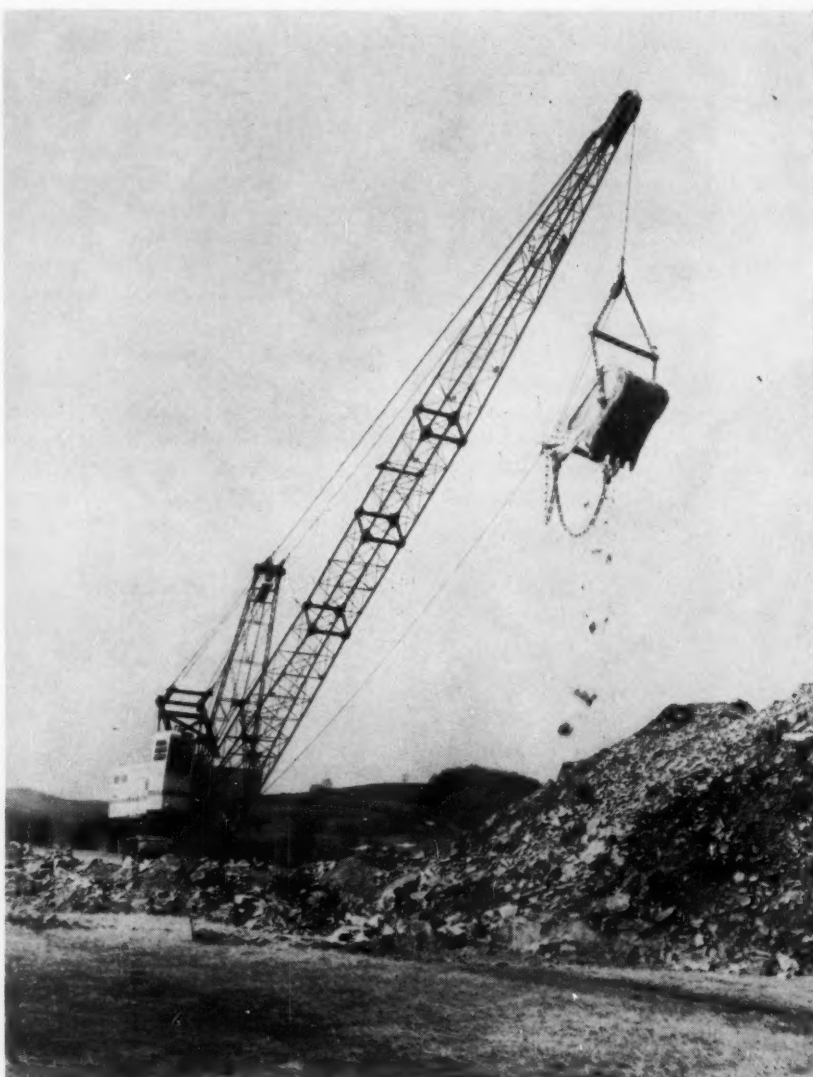
The clay occurs in a flat seam about 50 feet below ground level and varies in thickness up to eight feet. The high-grade clay is sold primarily to Harbison-Walker Refractories, Inc. at Clearfield for the manufacture of refractory bricks for lining blast furnaces. Some of the clay is used in constructing missile launching pads.

In the summer of 1960, officials of the firm — Alton Aughenbaugh, president, and his son, Jack vice-president — decided to replace their P & H Model 1055 diesel dragline with a larger P & H Model 1855 electric machine, considered the "workhorse of the coal industry." They felt that a bigger machine with longer boom was needed to cut stripping costs and that electric power would be more economical. Having experienced the performance and maintenance advantages of P & H Magnetorque swing on their 1055, they wanted a similarly-equipped machine.

Since installing the Harnischfeger-built dragline, Aughenbaugh Coal Co. reports that the larger 10-cubic yard machine with its longer boom has almost doubled production and has permitted better location of spoil banks. With its longer range, fewer moves are required, and the rig spends more time in actual production. Use of electrical energy instead of diesel fuel has reduced operating costs.

To supply the big dragline with power, the Pennsylvania Electric Co. (Penelec) installed a substation near the deposit to transform available 23,000-volt power to 4,160 volts. The dragline receives the three-phase, 60-cycle power through 1,500 to 2,000 feet of heavy cable. The principal motor on the big dragline is a squirrel cage type unit, rated at 600 hp.

Through the P & H Magnetorque, the main motor drives not only the swing motion but propel, drag and hoist as well, without costly conversion to DC current. Aughenbaugh records show that almost no adjustment of the Magnetorque system



Long range boom and 10-yard bucket herald presence of "workhorse of coal industry" — a Harnischfeger-built Model 1855 electric dragline — on 11-year-old clay stripping operation in central Pennsylvania for Aughenbaugh Coal Co. Unit was installed late last year (1960) and is largest dragline on single crawlers. To provide power for machine, Pennsylvania Electric Co. installed substation near deposit to transform voltage from 23,000 to 4,160 volts. Clay seam varies in thickness up to eight feet and is located some 50 feet below ground level in fairly consistent stretch between Curwensville and Lumber City, Pa. High grade clay is loaded to trucks by 1½-yard P & H shovel for delivery to Harbison-Walker Refractories, Inc., at Clearfield, for use in making refractory bricks for lining blast furnaces and for missile launching pads.

has been required and downtime for overall maintenance and repairs has been negligible.

Although the new machine has been producing satisfactorily at 4,000 cubic yards per eight hour shift, the owners feel that its output capacity is far greater. They point out that the machine has been working a "box" cut, freshly cut through virgin ground. When the machine makes its next pass adjoining and parallel to the present

cut, it will be able to work an additional area at right angles to the face itself, most of the overburden already broken.

The machine works two eight-hour shifts, the second shift under floodlights. Five days are devoted to production with a part of Saturday spent for maintenance.

Uncovered clay is loosened by blasting and loaded into trucks by a P & H Model 655B shovel 1½-yard capacity.

Step Up  
Your



Get the Allis-Chalmers HD-21 story  
from your *Highway* representative



Dollar for dollar, the new HD-21 gives you the biggest value in work capacity in the big tractor class. Powered by the improved 225-hp turbocharged engine . . . equipped with the world's most reliable torque converter drive, the HD-21 gives you real king-size coal output.

The new HD-21s, with new, redesigned 21000 engines, are maneuverable, easy to handle . . . best for every mine job.

A-8827A



◀ The HD-21 is ideal for every mine job.



▲ The HD-21 is maneuverable . . . easy to handle.



◀ Any way you look at it, the HD-21 is the biggest value in the big tractor field.



*Highway*

**HIGHWAY EQUIPMENT COMPANY**

6465 Hamilton Ave. • Pittsburgh 6, Pa.

40 Hoover Ave. • Du Bois, Pa.

5245 Peach St. • Erie, Pa.



The large amount of usable rimpull developed by the new 619 Series C Tractor-Scraper is indicated on this steep grade as machine leaves borrow pit. New compact design diesel engine has 280 maximum horsepower and unit is available with either torque divider power shift transmission or direct drive transmission.

● Automatically matching power to job conditions, a new power shifted 619 Tractor-Scraper the Series C, with 280 maximum horsepower has been announced by Caterpillar Tractor Co. Major features include 18 cu. yd. heaped capacity, an all new design turbocharged engine, 30 mph road speed, effort saving, air-actuated cable control and unitized construction.

The exclusive torque divider power shift transmission, similar in design to the one used on the Company's 630 and 631 Tractor-Scraper units, provides nine speeds with only three operator "shifts." As load resistance is overcome, the transmission automatically shifts within each speed range from torque divider drive to direct drive to overdrive. Downshifting also is auto-

matic in each range. To develop maximum rimpull at pusher matching speeds for fast loading, the unit can be locked in torque divider drive. A six speed direct drive transmission also is available.

Designed specifically for the 619C, the new four cylinder diesel engine incorporates "parallel ported" dual exhaust and intake valves, twin overhead camshafts and turbocharger pressure ratio control and aftercooling for maximum fuel combustion efficiency. The engine is rated at 250 flywheel horsepower. Its weight-saving design contributes significantly to overall machine balance and maneuverability.

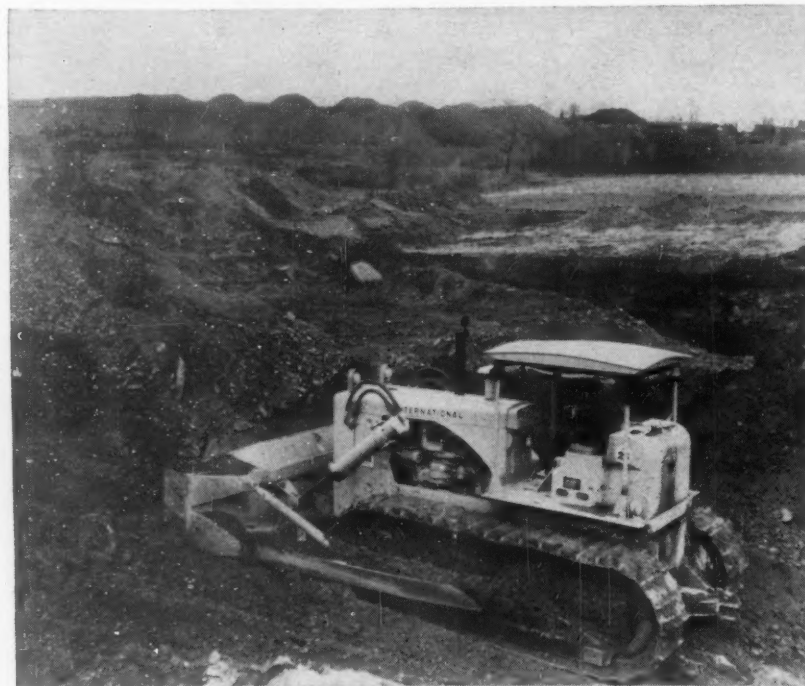
The new, air-actuated cable control cuts operator effort in half and is live powered. Operator "feel" is retained. Brake bands of 720 degree wrap-around design give increased operator control, greater load holding ability and smoother operation.

New, larger tires (26.5 x 29, 22 ply) encourage higher speed operation over rough terrain because of increased flotation and ability to better absorb jolts. This size also results in cooler operation and longer service life.

Strong, weight saving HT steel is used extensively in the 619C Scraper. This new material is located in the top and bottom sheets of the bowl bottom, for cutting edge supports and ribs, in the upper spreader, apron lip and apron arms. Sheave bearings are sealed and have 125 hour lubrication periods. Bowl lift sheave nest is six inches higher, providing dirt-free operation in loose materials.

Planetary final drives have 34 per cent greater reduction, lowering loads and stress carried by other power train components. Axles are full floating and are removable within minutes for easy service accessibility.

Full unit construction permits fast servicing of any major component without disturbing adjacent units. Easy access is provided by the swing-away dash and pivoting crankcase and transmission guards.

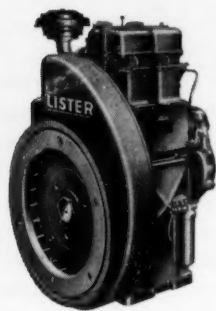


AS MUCH AS sixty feet of overburden is removed by International TD-25 crawler, in conjunction with dragline, at bituminous strip mine operation of Willowbrook Mining Company, two miles west of Slippery Rock, Pa. Overburden removal uncovers three-foot-deep seam. The TD-25 also backfills and benches for the dragline. The crawler, with an International TD-24 also in use, works 200-foot pushes.



# AIR-COOLED DIESEL POWER

—by *Lister*



Model HB 2  
24 HP @ 2000 RPM

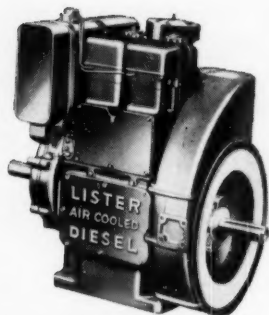
- Engineered to suit all types of applications.
- Totally enclosed working parts to insure continuous operation even under adverse conditions.
- Housing and adaptors to S. A. E. specifications.

A complete range of  
**AIR-COOLED DIESEL ENGINES**  
from 3½ HP to 72 HP

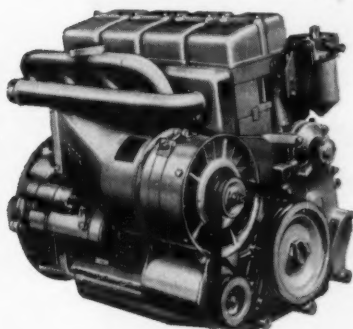
- Design simplicity reduces maintenance costs.
- Rugged construction for heavy duties.
- Economical operation with low fuel consumption.
- Dependable power for generating sets, pumps, compressors, etc., in mining operations.

**LISTER-BLACKSTONE, Inc.**

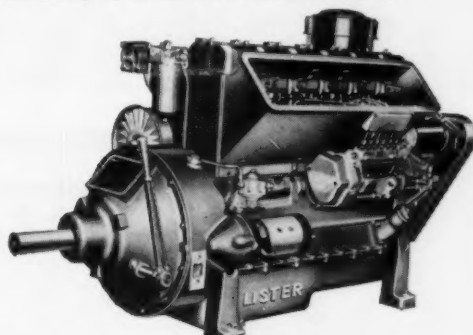
42-32 21st Street, Long Island City 1, N. Y. Tel.: Stillwell 6-8202



Model SL 2  
10½ HP @ 2250 RPM



Model SL 4  
20 HP @ 2150 RPM



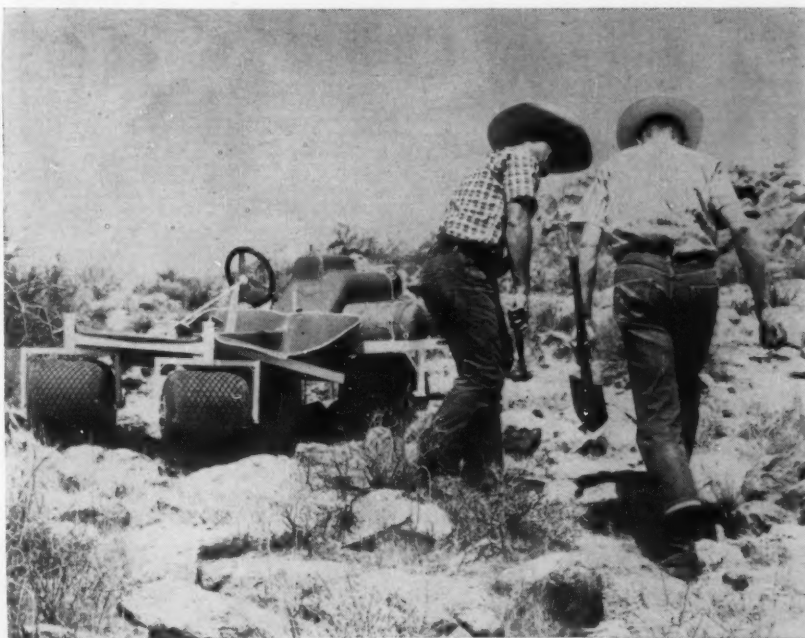
Model HB 6  
72 HP @ 2000 RPM

● A vehicle designed to provide transportation beyond the "end of the road" for geologists, prospectors, explorers, rock hunters and others who blaze their own trails was introduced recently.

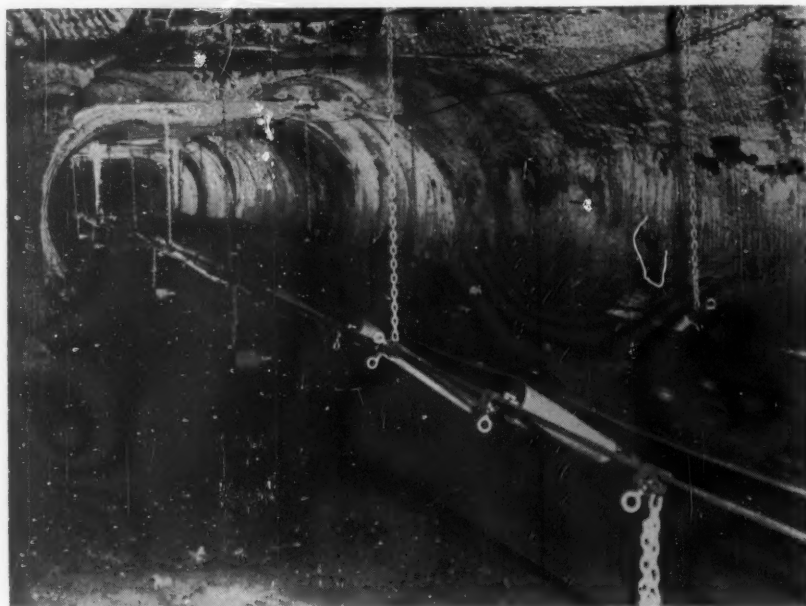
Remote Area Transportation Corporation said the four-wheeled "Desert Rat" will allow outdoorsmen to extend their searches to the least accessible places, traversing steep hills, swamp, sand and large rocks. It has molded plastic seats for two, and carrying space for equipment and supplies.

The Desert Rat's mobility is made possible by the use of Terra-Tires designed by The Goodyear Tire & Rubber Company for just such terrain as the vehicle must negotiate. The tires are 15 inches wide, twice as wide as passenger car tires, and 16 inches in diameter.

Their size, high sidewall deflection, and air inflation requirement of only two to five pounds per



**PACK MULE WITH MOTOR** — The sway-backed mules of the old '49ers never could have reached some of the places these fellows go in their new vehicle for geologists, explorers, prospectors, and other trail blazers. Mobility for the Desert Rat is provided by Goodyear's low pressure Terra-Tires to deliver a soft ride without bogging down or blowing out.



square inch, keep them from bogging down in sand or mud.

The "Rat" is expected to motorize recreation in the great outdoors, allowing hunters to go miles farther for the elusive quarry or the remote stream. Because it is so light, the "Rat" is transportable by trailer, truck, airplane or boat.

A four-cycle, one-cylinder gasoline engine powers the vehicle to speeds as high as 20 miles an hour. It has automatic transmission and its steering wheel is located so that either rider may control it. The vehicle is 84 inches long, 51½ inches wide, 38 inches high, and has a 59-inch wheel base.

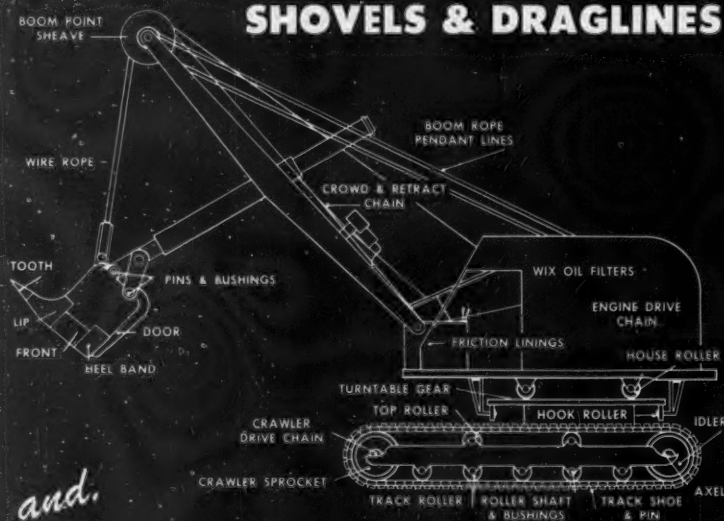
← A polyvinyl chloride solid woven mine conveyor belt in a distinctive red color is announced by Raybestos-Manhattan. Specifically designed for underground service, the new belt conforms to the U.S. Bureau of Mines specifications of fire resistance.

New techniques in controlled-tension weaving result in superior, lighter, and more uniform belt construction. Solid woven nylon and cotton strength member and interlocked weave provides tear resistance and exceptional fastener holding strength. Solid woven edge eliminates ply separation.

Both sides of the belt have a bright red PVC cover that make it highly resistant to abrasion. Either side can be used for conveying. The belt is completely moisture proof so mildew cannot start. Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, New Jersey.

● J. H. Price, vice president-sales of Truax-Traer Coal Co., Chicago, and H. M. Tibbs, vice president-operations, have been elected directors of the company.

## QUALITY REPLACEMENT PARTS FOR SHOVELS & DRAGLINES



*and.* In a most modern and well equipped rebuilding shop

### REBUILD TO STANDARD

TRACK SHOES • TRACK IDLERS • TRACK SPROCKETS • BUSHINGS  
HOOK ROLLERS • HOUSE ROLLERS • TRACK ROLLERS • SHAFTS • DIPPER

### MAXIMON MACHINE COMPANY, INC.

ALTOONA, PA. • 801 N. LOGAN BLVD. • WINDSOR 3-1156  
GROVE CITY, PA. • HARRISVILLE RD. (RT. 58) • PHONE 1422

## SALEM "HERCULES" AUGERS FOR ELECTRIC DRILLS

Made To Withstand High Drilling Speed, Whip And Torsional Strain Of Electric Drills



Drills holes faster - Will not snap off shank or chip points - Outlasts four or five ordinary augers

THE SALEM TOOL COMPANY

SALEM, OHIO, U.S.A.

## New Ripper Tips and Shanks Are Stronger, Longer Wearing

● Availability of improved design tips and shanks for Caterpillar No. 8 and No. 9 tractor-mounted Rippers has been announced by Caterpillar Tractor Co. Laboratory analyses and on-the-job tests have proved that the new components are stronger and wear longer than previous designs. The new designs and improved manufacturing methods have permitted a lower price on the new tips.

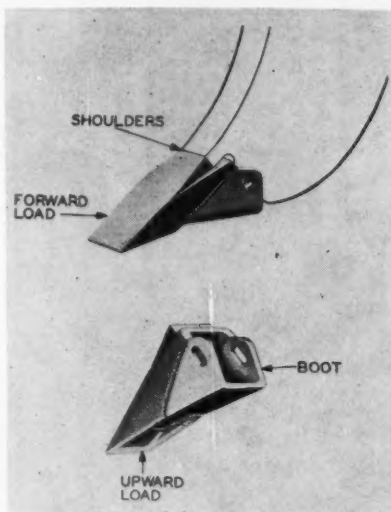
The tips are of two configurations, one for high impact applications, the other for use in highly abrasive material. Both are fabricated from alloy steel, hardened to Rockwell C50. They are made up of a forged baseplate and die-formed wrapper or boot, joined by a high penetration weld. The baseplate is of a channel section selected for its ability to resist bending without adding unnecessary weight. Because they are self sharpening, the tips retain good penetration quality throughout their lives.

During research testing of the impact tip, loads were applied equivalent to those which would result if the tip should encounter material strong enough to stop a D9 Tractor instantly. Successful resistance to these shock loads, together with on-the-job testing, proved the increased strength of the new impact tip. It costs less than half as much as the previous impact tip.

The new abrasion tip provides 75 per cent more wear material than its predecessor, and costs a third less. Besides being three inches longer than the new impact tip, it tapers to a 1 1/4 inch narrower point, is 3/8 inch thicker and weighs four pounds more.

The new design shank, designated Speed Shank, incorporates a slotted key design for mating tips to shanks. A shoulder on top of the tip butts against a similar surface on the leading edge of the

shank, transferring ripping loads to the shank rather than to the tip wrapper and retaining pin. Field tests of the new ripper components have proved that the slotted key design not only prevents shearing of the retaining pin, but helps prevent tooth breakage as well.



The new tips are made up of a forged channel section and a die-formed boot. Mating shoulders on the tip and shank transfer loads from the tip to the shank, and not to the retaining pin and boot.

The new shanks are flame-cut from rolled, alloy steel plates and heat treated for strength and wear resistance. Careful machining in critical stress areas provides the best possible fit between tip and shank and removes any scratches or tool marks that could weaken the shank.

Because of the slotted key design, the new tips will not fit any shank currently in the field. Weld-on adapters are available, however, that will permit use of the new tips with all former-design shanks from Caterpillar No. 8 and No. 9 Rippers, as well as with similar-sized shanks of other manufacturers.

● Greater welding efficiency is expected to result from a new proc-

ess called fiber metal resistance welding. A piece of fiber metal sheet, fabricated from thin metal fibers interlocked like a felt cloth, is placed between the surfaces that are to be resistance welded. This fiber metal sheet greatly increases the ratio of contact resistance to the bulk resistance, allowing the metal in the fiber mat to reach its melting point faster, while the base metal remains relatively cold.

In projection welding, the process allows more relaxed dimensional control and fit-up, greater reproducibility and ability to weld larger parts and areas. Resistance welding of refractory metals like tungsten and molybdenum will be improved since the new process offers the ability to weld these cold-worked or heat-treated metals without destroying the weld properties through recrystallization. Resistance welds of high conductivity metals such as copper will also be possible.

● North American Coal Corp. at its annual meeting last week elected as board members John N. Bauman, president of The White Motor Co., and William G. Stewart, president of Universal-Cyclops Steel Corp. The board of directors re-elected all officers and elected Frank A. Burke, formerly with Lorain Coal and Dock Co., vice president of sales.

● Robert W. Bruce, was named to succeed Huston St. Clair as president of Jewell Ridge Coal Corp. and Jewell Ridge Coal Sales Co., Jewell Ridge, Va. Mr. Bruce was formerly senior vice president of the Pittsburgh National Bank.

● Thermoelectrically cooled water will soon be available for offices. A new water cooler utilizes electricity passing through junctions of two dissimilar metals to create cold without the use of any moving parts. This cooling system requires about 25 per cent less volume than conventional systems.



# MARION . . . a dependable and profitable partner

## FOR HEAVY-DUTY HAULING

This heavy-duty, 10-yard Marion dump body is especially adaptable for use — in quarries . . . on construction sites . . . in and around gravel pits — wherever conditions are unusually severe and extra ruggedness is required for better off-the-road operations.

With this MD style body, contractors can take their choice of two types of extra strong, fast acting Marion hoists used for the dumping operation — a front mount telescopic hoist or an underbody, double arm hoist.

This combination of a heavy-duty Marion body and hoist has provided many owners throughout the country a dependable and profitable partner for their operations. It can do the same for you. We'd welcome the chance to give you all the facts.



**MARION METAL PRODUCTS CO.**  
Marion, Ohio, U.S.A.



(Continued from Page 8)

it is simply failure on the part of one to recognize that as he grows older his physical and mental self needs more and more relaxed sleep as each year goes by.

**Feeling of Failure**—Even though we occupy a top spot in our field this efficiency robber will sneak up on us from time to time. On such occasions it is a good idea to stop work and do a little self appraisal . . . adding up the assets and balancing them against those possessed by others we know. Closeness to our own job often brings about an untrue appraisal of just where we stand. It is also proven fact that deficit factors always loom larger than the credit ones unless we do such a balancing act from time to time.

**Decline In Mental Alertness**—It never pays to ignore or try to bluff through this situation. When we become aware that it exists or even suspicion that something of this nature is present it is time then and there to search out causes and do something toward eliminating them. Today's job calls for more and more mental alertness on our part . . . not less.

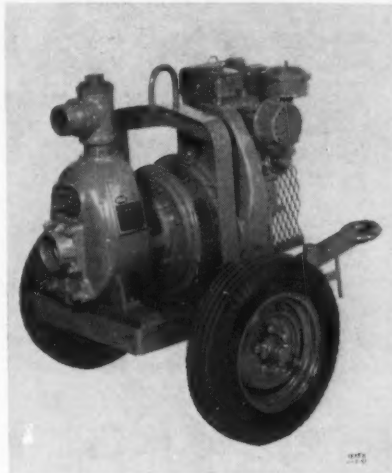
**Nervousness**—This is a terrible efficiency thief for it usually brings along a host of bad cousins. It should never be tolerated. At the first sign it calls for medical examination for the causes and their immediate remedy. The nervous individual never does the job properly . . . decreases the efficiency of everyone with whom he comes in contact.

In addition to the foregoing there are many others such as flightiness, sluggishness, backaches, loss of appetite, development of don't care attitudes, muscle soreness, discouragement, etc., which require the same attention and prompt handling.

Recognizing these efficiency robbers in our business personality keeps stress on the job at the lowest possible point. Taking time out to eradicate them not only assures us of an increase in efficiency on our own part but assurance that we will be able to get more out of the people on our staff every working day.

● A complete line of efficient heavy duty self-priming centrifugal pumps and diaphragm pumps powered by the economical and dependable LISTER air-cooled diesel engine is now available from the Rice Pump and Machine Company, Belgium, Wisconsin.

Many new features are incorporated in the design of this equipment to improve operation and life of the pump set and which also enables the equipment to be offered at a very competitive price. LISTER-BLACKSTONE, INC., P. G. Clarke, Sales Manager.



#### TRACTORS

A-C	HD-21-A
A-C	HD-16
I-H	TD-24
Cat.	D-8

#### SHOVELS AND DRAGLINES

- (2) B-E 54-B Highfront Shovel
- (2) LIMA—2101 Shovels & Draglines
- 1 Link-Belt K 370 Shovel & Dragline
- 1 LORAIN—820 Highfront Shovel
- 1 LIMA—34 Shovel ¾ yard bucket
- 1 NORTHWEST 25 shovel ¾ yard bucket
- 1 BAY CITY 65 shovel ¾ yard bucket

#### ANDERSON EQUIPMENT

P. O. Box 427 Bridgeville, Pa.  
Phone: LEhigh 1-6020

### P. R. PAULICK

Consulting Mining Engineer

Specializing: —

Cost Control • Management  
Modern Mine Mechanization Systems  
Economic Surveys • Appraisals  
Domestic and Foreign Work

2440 South Park Rd.

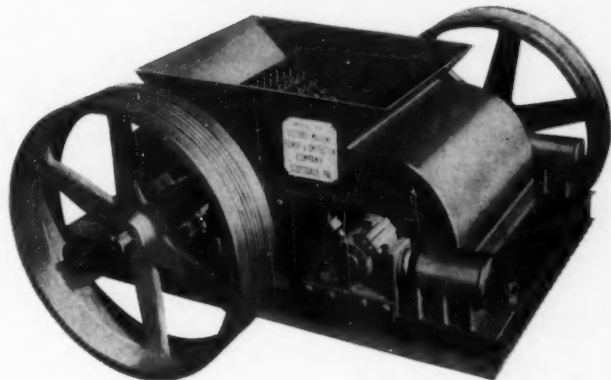
Bethel Park, Pa.

#### HEAVY EXCAVATION EQUIPMENT

Draglines, Shovels, Cranes, Drills, Trucks

9-W B.E. Elec. Drag, 200', 8 yd. or 160', 10 yd.  
9-W B.E. Diesel Drag, 165', 12 yd.  
7-W B.E. Diesel Drag, 140', 7 yd.  
7400 Marion Diesel Drag, 175', 13 yd.  
625 Page Diesel Drag, 150', 10 yd.  
631 Page Elec. Drag, 200', 8 yd.  
621-S Page Diesel Drag, 125', 7 yd.  
183-M Marion Diesel Drag, 130', 8 yd.  
200-W B.E. Diesel Drag, 125', 6 yd.  
2400 Lima Elec. Drag, 130', 6 yd.  
2400 Lima Diesel Drag, 130', 6 yd.  
7200 Marion Diesel Drag, 135', 5 yd.  
4500 Manitowoc Drag, 120', 5 yd. & 140', 4 yd.  
120-B B.E. Elec. Drag, 115', 5 yd.  
111-M Marion Drag, 100', 4 yd.  
1055 P&H Diesel Drag, 80', 4 yd.  
1601 Lima 4 yd. Shovel/Drag  
1201 Lima Drag, 85', 3 yd.  
3900, 3500 & 3000 Manitowoc Cranes  
5560 Marion 26 yd. Elec. Shovel  
5323 Marion 18 yd. Elec. Shovel  
190-B B.E. 9 yd. Elec. Shovel  
151-M Marion 7 yd. Elec. Shovel  
1600 P&H 6 yd. Elec. Shovels  
170-B B.E. 6 yd. Elec. Shovel  
4161 Marion 6 yd. Elec. Shovel  
2400 Lima 6 yd. Std. & H.L. Shovels  
120-B B.E. & 4121 Marion 4 yd. Elec. Shovels  
4500 Manitowoc 5 yd. H.L. Shovel  
1055 P&H 3 yd. H.L. Shovel  
1201 Lima 3½ yd. Standard Shovel  
111-M Marion Standard & H.L. Shovels  
3500 Manitowoc Standard & H.L. Shovels  
54-B B.E. Standard & H.L. Shovels  
Model T-650 REICHDRI Truck Mtd. Rotary and Down-The-Hole  
Ingersoll-Rand Truck and Crawler Mtd. Drillmasters  
McCarthy & Compton Coal Auger Drills  
Euclid Trucks, Dozers, Attachments, etc.  
Frank Swabb Equipment Co., Inc.  
313 Hazleton National Bank Bldg.  
Hazleton, Pa. — GLadstone 5-3658

## SCOTTDALÉ DOUBLE ROLL CRUSHERS



**ECONOMICAL** - takes less power

**EFFICIENT** - more uniform product

The powerful chilled cast iron double rolls of the 63 special are covered with hundreds of steel teeth which speedily bite, chew and shred the coal to any wanted size from ¾" to 8" . . . fines are held to a low minimum.

This 2 motor drive machine has gears but is equipped with 2 easily

maintained grooved flywheels. One welded steel hopper is mounted on a 46" x 65" welded steel base. Weighing only 4800 pounds and powered with 2—10 H. P. motors the crusher has a top speed of 150 RPM's with a capacity of 60 to 250 tons per hour. Comes with bronze bushed journal bearings.

Send for literature.

## SCOTTDALÉ

## MACHINE, FOUNDRY & CONSTRUCTION CO.

DEPT. CM

BOX 51

SCOTTDALÉ, PA.

GUYAN MACHINERY CO., Logan, W. Va. stock SCOTTDALÉ CRUSHERS

# PROFIT SHARING FOR EVERYBODY!

prices for any kind and quantity of mining equipment and/or complete mines. That's why we guarantee mine operators who buy from us an unflinching source of supply at fair prices always! Choose from our Huge Stock of the Best in latest type Mining Equipment. Six Mines now being dismantled in various sections of the country. Send us your inquiries. Known by the Reliability of our service as well as the quality of our product.

## JOY EQUIPMENT—REBUILT

- 3—Joy 14BU 9AE Super Loaders — 26" Hi — New 1958.
- 2—Joy 14BU Loaders, low pedestal, 7AE, 1956 & 57.
- 4—Joy 14BU Loaders, medium pedestal, 7RBE.
- 2—Joy 14BU 7CE high pedestal loaders.
- 4—Joy 14BU 3PE Loaders.
- 2—Joy 12BU Loaders complete with Piggybacks.
- 2—Joy 12BU Loaders, 9E latest type 250 V. DC.
- 3—Joy 12BU Loaders, 220/440 Volt AC.
- 1—Joy 20BU Loader, latest type.
- 4—Joy 18BU Loader, latest type.
- 1—Joy 8BU Loader, 84" overall height.
- 1—Joy 8BU Loader 220 V. AC.
- 1—Joy curved Bar Head for 14BU, complete.
- 6—Reliance 34-J Motors, 7½ H.P.
- 4—Reliance 33-J Motors, 10 H.P.
- 4—Reliance 40-J Motors, 15 H.P.
- 20—Reliance 9-J Motors, 4 H.P.
- 2—Goodman 660 Loaders on Crawlers 220/440 V. AC, like new.
- 1—Goodman 660 Loader on Crawlers, excellent 250 V. DC.
- 1—Goodman 665 Loader on Crawlers, latest type 250 V. DC.
- 1—Goodman 665 Loader, 26" hi. Rebuilt. 250 V. DC.
- 4—Joy 8SC Shuttle Cars, 26" Hi, rebuilt.
- 5—8SC Shuttle Cars, as removed from service, 26" Hi.
- 4—Joy 6SC Shuttle Cars, rebuilt, latest type
- 6—Joy 6SC Shuttle Cars, as removed from service.
- 1—Joy 5SC Shuttle Car, Excellent.
- 2—Joy 32E9 Shuttle Cars.
- 2—Joy 32E10 Shuttle Cars, rebuilt.
- 6—Joy 32E15 Shuttle Cars, rebuilt.
- 4—Joy 32E16 Shuttle Cars, rebuilt.
- 16—Joy 42E16 Shuttle Cars, rebuilt and as is.
- 1—Joy CD-22 Drih, on rubber, like new.
- 6—Joy T-2-2 low pan Crawler Trucks, rebuilt.
- 1—Joy T-2-6 low pan Crawler Truck with reel.
- 2—Joy T-1, Standard Crawler Trucks, 220 AC.
- 1—Joy T-1 Standard Crawler Truck, 250 DC.
- 4—Joy 11-B Cutting Mach., like new, 35 & 50 HP.
- 4—Joy 7-B Cutting Machines, like new, 250 and 500 Volt.
- 4—Goodman 212 Cutting Machines, 19" high.
- 2—Goodman 312 Cutting Machines, 17" high.
- 2—Goodman 412 Cutting Machines, 19" high.
- 1—Goodman Machine on Crawler, 31" high. All hydraulic.
- 6—Goodman 512 Machines with Bugdusters, rebuilt and as removed from service.
- 6—Goodman 612 Cutting Machines, 250 & 500 volt.
- 1—Jeffrey 70 URB rubber tired Cutter. Universal head, perfect condition.
- 1—Goodman 2410 Rubber Tired Cutter, Universal head, like new.
- 2—Joy 11RU Rubber Tired Cutters with Bugdusters. Universal heads, dual tires, like new, 250 V. DC.
- 1—Joy 10RU Rubber Tired Cutter, Universal head, 220/440 V. AC. Perfect
- 4—Joy 10RU Rubber Tired Cutters, Universal Head, 250 V. DC. Rebuilt or as is.
- 7—7AU's on track, Universal head.
- 2—Jeffrey 29UC Cutting Machines, Universal head, cuts anywhere in seam, 38" high, on Crawlers, 250 volt D.C.
- 4—Jeffrey 29LC on Crawlers, rebuilt or as removed from service.

## LOCOMOTIVES

- 1—Goodman 6 ton, 93-A, 27" high, armor plate frame.
- 1—Jeffrey 15 ton MH-77 locomotive, armor plate frame.
- 7—Jeffrey, 13 ton, type MH-110, 36", 42" and 44" ga.
- 2—Jeffrey 10 ton, type MH-110, 42" and 44" ga.
- 2—Jeffrey, 10 ton, type MH-78, 42" and 44" ga.
- 2—Goodman 8-30 and 10-30 Locos., 26" above rail.
- 1—Jeffrey MH-150, 6 ton, 26" overall height, rebuilt with reel.
- 12—Jeffrey, 6 ton, type MH-88, 42", 44" and 48" ga.
- 4—Jeffrey, 8 ton, type MH-100 2½" armor plate frames.
- 3—Jeffrey, 4 ton, type MH-96, 42", 44" and 48" ga.
- 1—G.E., 4 ton, type 825 Locomotive, 22" high.
- 10—G.E., 6 ton, types 801, 803, 821 Locomotives, 42", 44" and 48" ga
- 1—G.E., 8 ton, type 822 Locomotive, 44" ga.
- 3—G.E., 10 ton, type 809 Locomotives, 42", 44" and 48" ga.
- 2—G. E. 13 ton, type 829 Locomotives, armor plate frame.
- 1—Goodman 91A Locomotive, 8 ton, 26" overall height.
- 2—Goodman, type 33, 6 ton, 44" and 48" ga.
- 3—Westinghouse type 902, 4 ton, 42" and 48" ga.
- 1—Atlas Battery Locomotive, 36" ga.
- 1—Atlas Trolley Locomotive, 4 ton, 24" high.
- 2—Westinghouse, type 904, 6 ton, 44" and 48" ga.
- 2—Westinghouse, type 906, 44" and 48" ga.

- 2—Westinghouse, type 907, 10 ton, 44" and 48" ga.
- 3—Westinghouse 908, 13 ton, Locomotives, 42" and 48" ga.
- 8—Jeffrey MH-78 Locomotive Units, cheap.
- 4—Jeffrey MH-88 Locomotive Units, real bargains.
- 6—Jeffrey MH-100 Locomotive Units, reasonable.
- 3—Plymouth Diesel Locomotives, 8 and 10 tons, 42" and 44" ga.

Locomotive Trucks & Spare Armatures for the above.

## TIPPLE EQUIPMENT

- 1—All Steel 5 Track Tipple, new 1957, complete with washer, silo, oil treating system, all bolted construction.
- 1—Complete Five Track Tipple with Washers and Air Tables.
- 1—Complete stoker plant, all steel.
- 2—Complete Tipples, 3 & 5 track, steel and wood.
- 3—Cleaning Plants, 1 ea. McNally, Roberts and Schaefer, Jeffrey Washers and Air-Flo Tables.
- 4—Complete Aerial Trams for coal or refuse.
- 3—Complete Rope and Button Lines.
- 2—Monitor Lines complete with Drums, excel.
- 1—Allis-Chalmers 5 x 12 Rippflo Vibrator.
- 1—Allis-Chalmers 4 x 12 Low-Head Vibrator.
- 1—Robins Gyrex Vibrator, 4 x 10.
- 10—Belt and Apron type Loading Booms.
- 6—Shaker Screens.
- 1—Robins Car Shakeout.
- 1—Gundlach Crusher, like new.
- 20—Crushers, various sizes—Jeffrey, Link-Belt, McLanahan & McNally.
- 4—Mine Scales, 10 & 20 ton.
- 5—Truck Scales, 25 to 40 ton, New and Used.
- Feeders, Belt and Drag Conveyors, Car Retarders.

## CUTTING MACHINES

- 1—Joy 10RU Rubber Tired Cutter, Universal head, 220/440 volt AC. Perfect.
- 3—Joy 10RU Rubber Tired Cutters, Universal head, 250 V. DC, as is or rebuilt.
- 2—Joy 11RU Rubber Tired Cutters, 250 V. DC. rebuilt.
- 1—Goodman 2410 Rubber Tired Cutter. Universal head, new 1956. Excellent.
- 2—Jeffrey 29UC Universal Machines on Crawlers
- 1—Goodman on Crawlers, 31" overall height.
- 4—Baby Goodman 212's, rebuilt, 250 V. DC.
- 2—Goodman 312 Cutting Machines, 17" high.
- 3—Goodman 412 Cutting Machines, 19" high.
- 2—Goodman 512's with Bugdusters, like new.
- 4—Goodman 512's, rebuilt, or as removed from service.
- 6—Goodman 612's—250 & 500 Volt.
- 3—Goodman 112's, 220/440 Volt A. C.
- 4—Joy 7-B Cutting Machines, 250 and 500 Volt.
- 4—Joy 11B Cutting Machines, rebuilt, 35 & 50 H. P.
- 6—7AU's, on track, Universal head.
- 10—Goodman 12AA's and 112AA's, 220 V. D. C.
- 2—Goodman 324 Slabbers.
- 2—Goodman 724 Slabbers.
- 6—Jeffrey 35L's, like new, 250 V. D. C. 17" high.
- 2—Jeffrey 35L's, on low vein trucks.
- 3—Jeffrey 35BB's 220/440 A. C.
- 15—Jeffrey 35B's and 35BB's 250 V. D. C.
- 2—Jeffrey 29B's on track.
- 10—Jeffrey 29C's track mounted.
- 2—Jeffrey 29L's, on Crawlers. Excellent.
- 4—Sullivan CE7, 220/440 V. AC.

## CONVEYORS

- 2—Joy 1200 ft. Belt Conveyors 30" "Limberoller," like new.
- 1—Each 30" and 36" Joy 1000' extensible belt, latest type, like new.
- 1—Goodman 97HC 30" Rope Belts, 1000' perfect, 72-B or without rubber.
- 4—Jeffrey 52-B tandem drive 30" and 36" Belt Conveyors, 600' to 2000'.
- 1—Jeffrey 52-B tandem drive 26" Belt Conveyor.
- 1—Joy 30" Underground Belt Conveyor. Excell.
- 1—Goodman 97-C, 30" tandem drive.
- 1—Robins 38" tandem drive, with or without motor.
- 5,000'—52-B Belt Structure 30".
- 1,000' Conveyor Belt, 42".
- 1,500' Conveyor Belt, 36".
- 2,000' Conveyor Belt, 30".
- 1,000' Conveyor Belt, 26".
- 8—Jeffrey 61AM 12" Chain Conveyors, 300'.
- 2—61EW Elevating Conveyors.
- 2—61WH 15" Room Conveyors, 300'.
- 2—Joy 15" Room Conveyors, 300'.
- 2—Joy 20" Conveyors, 300'.
- 4—Joy Ladel UN-17 Shakers.
- 10—Goodman G-12½ and G-15 Shakers.
- 1,000' Goodman 18" Flat Belt Conveyors, tandem drive any length. Perfect.

## CONVERTORS AND DIESEL PLANTS

- 1—300KW G. E. Stationary Rectifier.
- 2—500KW G. E. Stationary Rectifiers.
- 4—1,000KW Stationary Rectifiers.
- 2—100KW G. E. TCC-6's, 275 V., Rotary Converter.
- 1—150KW G. E. HCC-6 275 V., Rotary Converters.

We share our profits with those from whom we buy and to whom we sell, by passing on the savings of large-scale, diversified operation. That's why we pay year-round fair prices to mine operators who buy from us an unflinching source of supply at fair prices always! Choose from our Huge Stock of the Best in latest type Mining Equipment. Six Mines now being dismantled in various sections of the country. Send us your inquiries. Known by the Reliability of our service as well as the quality of our product.

- 1—150KW, 6 phase, Allis-Chalmers Rotary Converters, 275 V. D. C.
- 2—200KW G. E. HCC-6's, Rotary Converters, 275 V. D. C. Steel frames, Newly rewound.
- 3—300KW G. E. HCC-6's Rotary Converters, 275 V. D. C. Like New.
- 2—300 KW West., 6 phase, Rotary Converters, 275 V. D.C.
- 2—500KW West. Rotary Converters, 275 V. D.C.
- 1—200KW West. Rotary Converter, 275 V. D.C. Newly rewound.
- (All the above with 6900/13000 and/or 2300 /4000 primary transformers).
- 1—50KW MG Set.
- 1—100KW MG Set, 275 V. D.C.
- 6—150KW MG Sets, G. E. and West., 275 V.D.C.
- 2—200KW MG Sets, West., rebuilt, 275V. D.C.
- 1—200KW MG Set, G. E. perfect, 275 V. D.C.
- 2—300KW G.E. MG Sets, like new.
- 3—300KW Westinghouse MG Sets, 275 V., rebuilt.
- 1—300KW West. 600 volt MG Set, rebuilt.
- 2—200KW, G.E. Rotary Converters, 600 V. D.C.
- 2—300KW Westinghouse, 600 volt, 6 phase, Rotary Converters.
- 4—300KW G.E. Rotary Converters, 600 V. D.C.
- 2—500KW Westinghouse, 600 volt, D.C., 6 phase, Rotary Converters.
- 2—500KW G.E. HCC-6's, Rotary Conv., 6 phase, 600 V. D.C.
- 3—GMC-671 Diesels w/75 & 110KW, 250 V. D.C.
- 1—Int. VD-14 Diesel with 50KW, 250 V. D.C. Gen.
- 1—GMC-471 Diesel with 60KW, 250 V. D.C. Gen.
- 1—100KW Natural or LP Gas Engine with Generator.

## LOADING MACHINES

- 16—Joy Loaders, 14BU, 12BU, 8BU, 11BU, 20BU.
- 5—Joy 12BU9E Loaders, 220/440 V. A.C. Excellent.
- 3—Joy 12BU9E Loaders, latest type.
- 2—Joy 12BU with Piggyback Conveyors.
- 2—Goodman 865 Loaders, 26", on crawlers.
- 1—Goodman 665 Loader, on Crawlers, rebuilt.
- 2—Goodman 660 Loaders, 440 V. A. C. perfect.
- 1—Goodman 660 Loader, on Crawlers, 250 V. DC.
- 1—Goodman 460, on track, rebuilt, all hydraulic.
- 2—Jeffrey 61 CLR's on rubber, 26".
- 3—Jeffrey L-500 Loaders.
- 2—Myers Whaley, No. 3 Automatic Loaders.
- 2—Clarkson Loaders, 26" above rail.

## MISCELLANEOUS

- 1—Jeffrey 76—A Col Mol, 220/440 perfect.
- 1—Joy 5 JCM Continuous Miner, 220/440, perfect.
- 150 Tons Copper—4/0 and 9 Section Trolley 1/0, 2/0, 4/0 Stranded, 500 MCM, 750 MCM, 1,000,000 MCM Insulated.
- 1—Each 4', 5', 6' & 8' Hi Pressure Joy & Jeffrey latest type Fans.
- 1—Complete Five Track Tipple with washers and Air Tables.
- 5—Complete Tipples, 3 to 5 Track. Wood and Steel.
- Steel trestles for drop bottom cars.
- All Steel Armo Buildings.
- 20—Jeffrey Molevators on rubber tires.
- 1—¾ Yard Shovel and Back-Hoe.
- 2—¾ Yard Crawler Cranes, Gas.
- Battery Supply Tractors, Rubber Tired.
- 1—Cantrell Air Compressor on rubber tires.
- 10—Air Compressors, 1 H.P. to 40 H.P.
- 1—Joy self-propelled rubber tired comp., 240 cu. ft.
- 1—Acme self-propelled rubber tired compressor, 130 cu. ft.
- 40—Mine Pumps, all types.
- 1—Differential 40 passenger Man-Trip car.
- 6—MSA Rock Dusters.
- Joy Roof Drills—Schroeder Coal Drills.
- 2—Phillips Carriers, 44" and 45" ga.
- 1—Barber-Greene self-propelled Bucket Elevator.
- Pipe, Plastic, Steel Transit, all sizes 1" to 6".
- 25,000 Roof Bolts, all types.
- 300—Mine Cars, drop bottom, 42" 44" 48" Ga.
- 300—Mine Cars, 18" high, end dump, 42", 44", 48" Ga.
- 1—10 ton Mine Car Scale with Recorder.
- 4—Brown Fayro 15 HP latest type Hoists.
- 15—Brown Fayro HKL and HG Car Spotters.
- 1—Brown Fayro Hydraulic Car Spotter.
- 1—12 ton Differential Slate Larry.
- Incline Hoists, 25 to 150 HP.
- Shaft Hoists to 700 HP complete.
- 1—Jeffrey 5', 6' & 8', Like New, Aerodyne Fans.
- 6—Storage Tanks, 6,000, 8,000, 10,000 gallons.
- 10,000 Five Gallon G. I. Cans, screw lids.
- 2,500 tons Relaying Rail, 25lb., 30lb., 40lb. 50lb., 60lb., 70lb., 90lb., 100lb.
- 500 MCM, 750 MCM 1000 MCM Bare & Insulated.
- Thousands of feet of rubber covered three conductor cable. All sizes.
- 500—Transformers from 1 to 500 KVA, 110 to 13,000 primary volts.
- 400—Electric Motors, 3 to 250 H.P.
- Huge Stock of Mine Supplies.
- 600—MSA Mine Lamps, Chargers, etc.
- 4—Mine Scales, 10 & 20 tons.
- 5 Truck Scales, 25 to 40 tons, late type.
- Mack & International tandem dump trucks.

THOUSANDS OF OTHER ITEMS.

WE BUY — SELL — TRADE  
We Own What We Advertise

J. T. FISH

Phone PL 2-4400  
LOGAN, WEST VA.





This REICHbilt and world's largest Blast Hole Drill is operating at the Harwood Stripping operation of the Sullivan Trail Coal Co. near Hazleton, Pa.

An interesting feature of this drill is the automatic feature for adding and withdrawing drill stems from the air conditioned operator's cab without the necessity of helper using tongs or wrench. This is accomplished as follows:

The hydraulic powered, remotely controlled joint break-out device is mounted at the lower extremity of the mast and, on the main drilling deck, the device consists of hydraulic powered tongs which engage slots in the upper tool joint. The tongs are then rotated by means of a hydraulic motor and worm reduction to break the joint.

The joint on the lower drill stem

is prevented from turning or falling by heat treated tongs which engage slots in the drill stem by hydraulic power; thus, all break-out and stem adding operations are controlled from the operator's cab.

#### Method of Driving Rod:

Drill stems are top driven through a rotary head, powered by two high pressure axial piston type hydraulic motors driving through heavy gear reduction in all steel housing and oil bath.

Infinitely variable rotation speeds from 0 to 76 rpm are controlled by two variable volume piston hydraulic pumps, powering the hydraulic motors driving the rotary head. Output torque is sufficient to maintain constant rotational speed through entire down pressure range. Down pressure maximum 90,000 lbs. at stall conditions.

## ADVERTISERS' INDEX

AUGUST, 1961

Anderson Equipment .....	29
Beckwith Machinery Company 2nd Cover, 2, 3, 10, 15 to 18, 3rd Cover	
Cleveland Bros. Equip. Co., Inc. ....	10
Davey Compressor Co. ....	1
Fish, J. T. ....	30
Highway Equipment Co. 1st Cover, 7, 23, 4th Cover	
Lister-Blackstone, Inc. ....	25
Manitowoc Sales and Service Corp. ....	32
Marion Metal Products Co. ....	28
Maximon Machine Company ....	26
Ohio Machinery Company ....	10, 15 to 18
P. R. Paulick .....	29
Salem Tool Company, The ....	26
Scottdale Machine, Foundry & Construction Co. ....	29
Swabb, Equipment Co., Inc. ....	5, 29
Thorpe Equipment Corp. ....	9
Walker Machinery Co. ....	10, 15 to 18

Vertical traverse is accomplished through two heavy duty, high strength roller chains connected to either side of rotary head which is slideably retained in the mast. Chains are driven by piston type hydraulic motor.

#### Operating Conditions

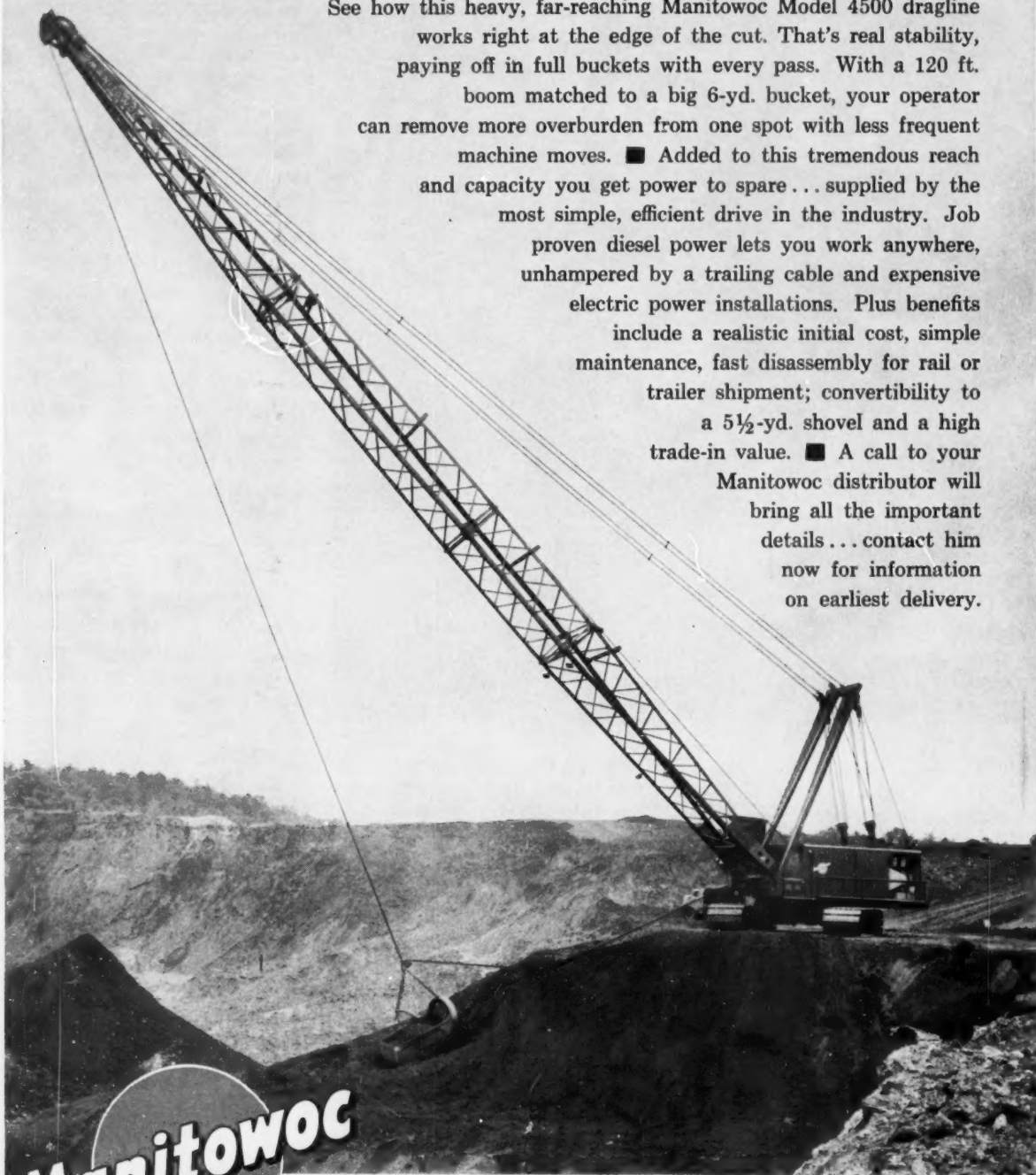
12-1/4" holes are drilled in broken sandstone and conglomerate rock on spacings of 20' x 25'. Hole depths vary between 84' and 120'. Can drill to 150 ft. with stems carried on machine.

The Model C-950 REICHdrill started working on the Harwood Stripping during June 1960. The average footage obtained per hour, rock, depth of hole, etc., has averaged between 55' per hour and 40' per hour. Also, depending upon drilling conditions, bit life has averaged between 860' and 1,125' per bit.

An interesting comparison between the C-950 REICHdrill, weighing 180,000 lbs., and another make of 12-1/4" Rotary Drill, weighing 120,000 lbs., at work on this same operation is as follows:

Because of greater torque and down pressure, increased amount of air for cleaning holes, and substantially greater weight of the REICHdrill, it has averaged at least 25% more with an increase in bit life of 29-8/10%.

# Nothing fits **STRIP MINING** like this fast, mobile 6-yd. *diesel-powered* **MANITOWOC!**



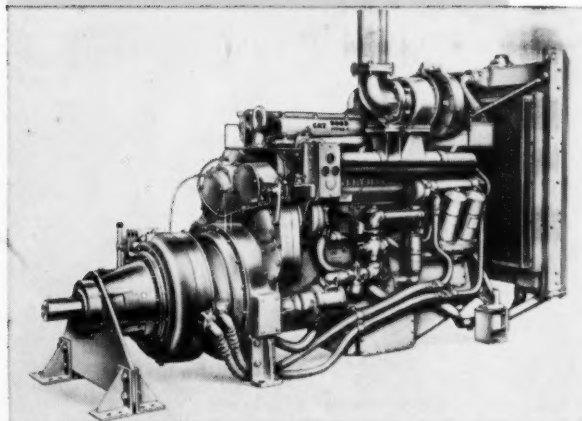
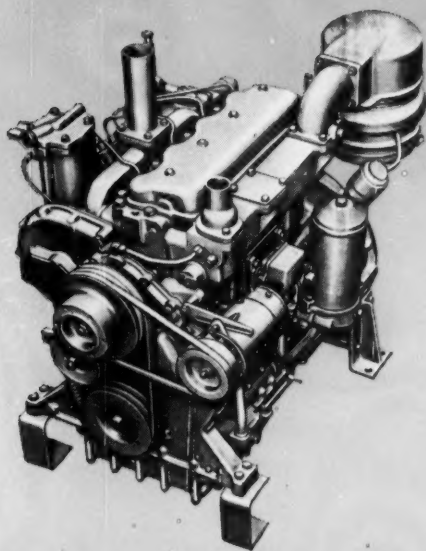
See how this heavy, far-reaching Manitowoc Model 4500 dragline works right at the edge of the cut. That's real stability, paying off in full buckets with every pass. With a 120 ft. boom matched to a big 6-yd. bucket, your operator can remove more overburden from one spot with less frequent machine moves. ■ Added to this tremendous reach and capacity you get power to spare... supplied by the most simple, efficient drive in the industry. Job proven diesel power lets you work anywhere, unhampered by a trailing cable and expensive electric power installations. Plus benefits include a realistic initial cost, simple maintenance, fast disassembly for rail or trailer shipment; convertibility to a 5½-yd. shovel and a high trade-in value. ■ A call to your Manitowoc distributor will bring all the important details... contact him now for information on earliest delivery.



**Manitowoc**

## **MANITOWOC SALES AND SERVICE CORP.** (24 hour-a-day service)

Main Ohio Office: 4541 West 35th Street State Road Cleveland, Ohio Phone: FLorida 1-8001  
Other Ohio Office: 878 East High Avenue New Philadelphia, Ohio Phones: 72107-72108



# Consider Beckwith Your **POWER CENTER**

for all your repowering needs

It's vital that your equipment is kept producing every minute it's on the job . . . all season. Let us put new punch into tired machines with Caterpillar Engine Power . . . power that won't get sensitive when the work gets rough.

Our power specialists can repower with a rugged Cat Engine package to fit your exacting requirements . . . economically too. Available in ranges of up to 730 HP, they run economically to give you top job efficiency and lowest final cost.

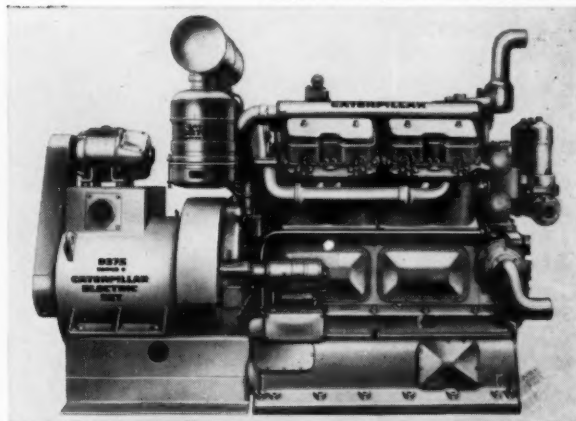
May we discuss the advantages of putting your repowering job in our hands. Call us soon . . . we'll give you full details on the versatile line of Caterpillar Diesel Engines.

## THERE'S A CATERPILLAR ENGINE PACKAGE TO FIT **EVERY** NEED

**NEW, COMPACT D320, 120 HP** — typical of the new, smaller Cat four-cycle Engines. Turbocharged and aftercooled to efficiently pack maximum power into minimum space. Power-to-weight ratio compares favorably with gasoline and automotive diesel engines.

**CAT D353 DIESEL ENGINE** — The tractor configuration of this engine powers the rugged Cat D9 Tractor. Designed to deliver peak torque under varying conditions. Available with matched clutch, torque converter or as 200 KW Electric Set.

**CAT D375 ELECTRIC SET, 250 KW** — Power-matched engine and generator built by Cat. Self-regulating generator produces power for less than the majority of commercial electric costs.

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.


**engine  
power**  
BY CATERPILLAR

YOUR  
CATERPILLAR  
POWER  
CENTER

**Beckwith**  
MACHINERY COMPANY

6500 HAMILTON AVENUE, PITTSBURGH 6, PENNSYLVANIA  
261-369 CONGRESS STREET, BRADFORD, PENNSYLVANIA  
OLD TOWN ROAD, CLEARFIELD, PENNSYLVANIA  
1356 EAST 12TH STREET, ERIE, PENNSYLVANIA  
ROUTE 219 NORTH, SOMERSET, PENNSYLVANIA  
BUCKHANNON PIKE, CLARKSBURG, WEST VIRGINIA



Built to do  
**MORE**  
mine work!



**NEW**

**ALLIS-CHALMERS**

**TL**

**30**

The new TL-30 will give you far more production than you ever believed possible with any tractor loader.

184 hp

10,500-lb carry capacity

3- to 6-cu-yd buckets

Weight: 28,400 lbs.

The TL-30's A-C 11000 turbocharged diesel delivers 184 hp . . . up to 13% more power than others its size. And—the TL-30 carries up to 10,500 lbs . . . 16% more than other loaders of its class. This extra capacity speeds coal handling . . . reduces costs on every shift.

And . . . these are only a few of the many advantages that you gain every day you operate your new TL-30 . . . the coal industry's most modern, most efficient tractor loader.

Ask your Highway representative for full details—today!

A-61271 A



In addition to the TL-30, there are 5 other tractor loader models—77 to 130 hp . . . 3,600 to 9,000-lb carry capacities. Photo shows TL-16.



*Highway*

**HIGHWAY EQUIPMENT COMPANY**

6465 Hamilton Ave. • Pittsburgh 6, Pa.

40 Hoover Ave. • Du Bois, Pa.

5245 Peach St. • Erie, Pa.

